

CA3 ONHW Q90
82 U6502 v.10

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URBAN/MUNICIPAL

MANN TESTING LABORATORIES
REPORTS

Reference 27

CA3 ONNW Q90
82 U6502 V.10



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

Reported

November 15, 1983

Reference 27

Ms. Anne Koven
Research Director
Upper Ottawa Street Landfill Study
412-20 Jackson Street West
Hamilton, Ontario
L8P 1L2

URBAN MUNICIPAL

APR 30 1987

GOVERNMENT DOCUMENTS

Re: Mann Test File 830461
Sorbent Tube Sampling
Landfill and Peripheral Sites

Dear Ms. Koven:

The following is a report on the analytical findings from eight solid-sorbent tube samples that were collected July 22, both from the site, and at peripheral locations as follows:

<u>Sample</u>	<u>Location</u>	<u>Sample Volume</u>
1	Goose Neck	500 mL
2	Goose Neck	500 mL
3	Goose Neck	Passive Adsorption
4	Fire Hall (downwind)	3 L
5	Blessed Tekakwitha School	2 L
6	CB Sterling School	2 L
7	Control - Upper St. James/West 5th	2 L
8	Upwind of Dump Site - Limeridge at Upper Ottawa - 1 block east.	2 L

For the purpose of this report, the Goose Necks were arbitrarily numbered from 1 to 13, starting with number 1 at the North West end of the landfill site. Samples 1 and 2 were collected by drawing air through the sorbent tubes while walking approximately two feet in front of, and downwind of the thirteen goose necks. The tube was held about three feet above the ground, and therefore about 1.5 feet above the top of the downpipe opening.

Sample #3 was collected by exposing the sorbent tube one foot below the opening of gooseneck #2. The sample was thus collected by passive adsorption over a ten minute period. The remaining samples were taken on locations peripheral to the dump site, by orienting the tube opening in the general direction of the landfill, and drawing air through the tube at 50 mL/minute.

Analysis of the sorbent tubes was achieved by Gas Chromatography/Mass Spectrometry (GC/MS), following thermal desorption with a Model 780A Universal Automated Concentrator (Envirochem, Kemblesville PA). This unit releases the trapped organics onto two additional traps that are connected in series. The last trap is a small bore tube which reduces the sample to a small plug, for introduction to the capillary column.

For each component detected from the sample, the computer produces a printout of the individual components, with the 3 best matches for each, from the library. The closeness, of match, or fit is listed in terms of purity, with 1000 being a perfect match, ion for ion. The three best matches are displayed in order of purity, and the best fit is listed in the printout summary. Those components having a purity below 750 are listed as unknown, and require that a manual library search be conducted in an effort to produce an identification.

Additional data contained in the printout is the peak area, relative amount and percent of total sample. This is strictly a semiquantitative approach, in which normalization is on the largest peak.

The compounds identified from each of the eight samples are shown in Tables 1 to 8.

The following instrumentation and parameters were used in the GC/MS analysis of the sorbent tube samples:

Finnegan Mass Spectrometer Model 4500

Universal Automated Concentrator Model 780A

DB1 Capillary Column 30 meter

Temperature Programming - 5 min at 50°C
50°C-285°C @ 12°C/min
285°C for 10 minutes

The quantitative standard was prepared by adding one microgram of each pure substance to 10 milliliters of glass distilled methanol. One microliter of the standard solution was injected directly onto a precleaned sorbent tube and processed using the same parameters as for the samples. The chromatograms

and MS computer printouts for each of the eight samples and the standard are included with this report. The quantitative results were based on peak area comparisons, and calculated on the basis of air sample volume.

On the day that the samples were collected, the air temperature was in the mid 20°C range and a slight breeze was blowing from the North. Should the concentrations appear on the low side, this may have been a factor. Also, because of time limitations, the sample volumes were somewhat lower than those normally collected.

Dichloromethane was found to be the predominant component in each of the samples, but this was mainly attributed to the extensive use of this compound in the laboratory during the period in which the samples were analysed. This was confirmed by running a sorbent tube that had been precleaned, capped and parafilmmed, and exposed to laboratory air for several hours. The Styrene stock that was to be used for standard preparation was found to be polymerized and fresh stock was not immediately available. Quantitation of this compound is quite difficult, because it is frequently present from a neighbouring industry, where this compound is used in their manufacturing process.

In examining Table 9, a similarity exists both in the compounds detected, and the concentrations for each of the gooseneck samples 1 and 2. Samples 5 and 6, Blessed Tekakwitha and CB Sterling Schools, despite the close proximity, were found to be considerably different, with a larger number of compounds detected in the latter sample. Both were of equal sample volumes, and collected in a similar manner. The control sample #7, collected at Upper St. James and West 5th, also contained a larger number of components despite the actual sample location which was approximately 40-50 yards from the highway. Because of these findings, it is difficult to project a trend.

If you have any questions concerning this report, please call me.

Yours truly,



Bill Burgess, B.Sc.
Manager, Occupational Health

BB/jh,
Encl.

TABLE 1 SORBENT TUBE #1 GOOSENECK MS FILE 4906

Scan #	Component	Purity	Rel. Amount	Quantitation
141	Dichloromethane	905	100.0	
164	Toluene	925	5.37	86.5 ppb
183	*Silicone	728	1.19	
192	*Silicone	682	3.05	
225	Xylene(Isomer)	929	3.95	25.6 ppb
247	Styrene	862	8.25	
345	C ₃ Benzene (MethylEthyl)	846	0.32	0.82 ppb
418	Silicone	911	3.98	
449	Dichlorobenzene(Isomer)	767	0.82	2.75 ppb
601	Hydrocarbon C11	910	0.38	
678	Silicone	865	0.42	
710	Naphthalene	678	0.10	0.38 ppb
726	Hydrocarbon	866	0.17	
829	*Hydrocarbon	743	0.06	

* Identification by manual library search

TABLE 2 SORBENT TUBE #2 GOOSENECK MS FILE 4905

Scan #	Component	Purity	Rel. Amount	Quantitation
142	Dichloromethane	922	100.0	
164	Toluene	912	5.47	59.7 ppb
225	Xylene(Isomer)	951	7.46	32.6 ppb
246	Styrene	824	12.06	
344	Unknown(C ₃ Benzene)	685	0.52	
416	Silicone	838	0.49	
449	Dichlorobenzene(Isomer)	847	1.05	2.4 ppb
471	Unknown Hydrocarbon+	538	0.41	
600	Hydrocarbon C ₉	826	0.60	
678	Unknown	335	0.11	
711	Naphthalene	871	0.18	0.44 ppb
726	Hydrocarbon	859	0.21	
827	Hydrocarbon	858	0.09	
1139	Unknown Trace	660	0.51	
1144	Unknown Trace	371	0.59	

TABLE 3 SORBENT TUBE #3 GOOSENECK 7 (passive) MS FILE 4904

Scan #	Component	Purity	Rel. Amount	Quantitation
144	Dichloromethane	902	100.0	
172	Toluene	926	4.53	94.9 ng
240	Xylene(Isomer)	909	3.21	30.8 ng
263	Styrene	915	8.35	
374	Benzene C ₃ methylethyl	757	0.30	1.8 ng
388	Unknown	622	0.28	
439	Unknown	567	0.30	
475	Dichlorobenzene(Isomer)	888	0.83	6.8 ng
614	Hydrocarbon C ₁₀	883	0.41	
733	Hydrocarbon C ₈	876	0.19	

TABLE 4 SORBENT TUBE #4 FIRE HALL MS FILE 4903

Scan #	Component	Purity	Rel. Amount	Quantitation
114	Sulfurdioxide	985	0.31	
141	Dichloromethane	848	100.0	
168	Toluene	966	4.56	6.05 ppb
190	Silicone	772	1.51	
234	Xylene(Isomers)	944	4.39	2.35 ppb
258	Styrene	881	8.98	
367	Benzaldehyde	893	1.09	0.8 ppb
438	Silicone	773	1.17	
466	Dichlorobenzene(Isomer)	880	1.38	0.38 ppb
566	Ethanone,1-Phenyl	860	1.09	
609	Hydrocarbon C ₁₁	914	0.56	
683	Unknown	309	0.13	
716	Unknown	430	0.18	
730	Hydrocarbon C ₁₃	832	0.31	
827	Hydrocarbon C ₁₃	805	0.16	
1141	Unknown	669	0.44	

TABLE 5 SORBENT TUBE #5 BLESSED TEKAKWITHA SCHOOL MS FILE 4902

Scan #	Component	Purity	Rel. Amount	Quantitation
140	Dichloromethane	922	100.0	
207	Xylene(Isomer)	949	2.69	3.84 ppb
225	Styrene	917	8.31	
310	Unknown	597	0.57	
358	Unknown	230	0.77	
398	Dichlorobenzene	754	0.58	0.43 ppb
573	Hydrocarbon C ₈	848	0.27	
585	Unknown	657	0.17	
714	Hydrocarbon C ₉	836	0.14	
822	Hydrocarbon C ₁₀	773	0.08	

TABLE 6 SORBENT TUBE #6 CB STERLING SCHOOL MS FILE 4901

Scan #	Component	Purity	Rel. Amount	Quantitation
113	Sulfurdioxide	990	0.39	
144	Dichloromethane	869	100.0	
190	Toluene	970	7.75	23.1 ppb
290	Xylene(Isomer)	953	3.75	3.1 ppb
325	Styrene	923	9.0	
454	C ₃ Benzene(Methylethyl)	788	1.16	0.6 ppb
502	C ₃ Benzene(Trimethyl)	957	0.84	0.4 ppb
513	Silicone	587	0.40	
529	Dichlorobenzene(Isomer)	909	1.83	1.14 ppb
618	C ₄ Benzene (Dimethylethyl)	753	0.19	2.16 ppb
628	C ₄ Benzene(Me/MeEthyl)	684	0.19	2.16 ppb
643	Hydrocarbon C ₁₁	919	0.68	
652	Unknown	622	0.28	
667	C ₄ Benzene(Tetramethyl)	759	0.1	0.03 ppb
701	C ₄ Benzene(Ethyldimethyl)	839	0.27	3.04 ppb
735	Naphthalene	797	0.21	0.14 ppb
747	Hydrocarbon C ₉	811	0.35	
760	1-pentanol, 4-Me-2-propyl	809	0.13	
837	Hydrocarbon C ₈	832	0.19	
924	Hydrocarbon C ₉	906	0.13	

TABLE 7

SORBENT TUBE #7

CONTROL

MS FILE 4900

Scan #	Component	Purity	Rel. Amount	Quantitation
130	Dichloromethane	870	100.0	
168	Toluene	890	7.29	22.4 ppb
197	Silicone	858	6.90	
202	Silicone	901	6.76	
251	Xylene(Isomer)	946	2.52	3.1 ppb
280	Styrene	896	9.07	
408	C ₃ Benzene(Ethylmethyl)	765	0.22	0.11 ppb
463	C ₃ Benzene(Trimethyl)	912	0.67	0.33 ppb
475	Silicone	950	8.96	
494	Dichlorobenzene(Isomer)	917	1.33	0.85 ppb
600	C ₄ Benzene(Tetramethyl)	717	0.19	0.05 ppb
618	Hydrocarbon C ₁₁	938	0.48	
663	Unknown	482	0.09	
685	Silicone	933	1.17	
729	Hydrocarbon C ₁₃	855	0.21	
863	Silicone	619	0.13	

TABLE 8

SORBENT TUBE #8

UPWIND

MS FILE 4899

Scan #	Component	Purity	Rel. Amount	Quantitation
107	Dichloromethane	890	100.0	
154	Toluene	961	6.26	15.5 ppb
191	Silicone	917	1.25	
252	Xylene(Isomer)	960	5.52	5.48 ppb
287	Styrene	975	19.08	
416	Ethanone,1-Phenyl	802	1.34	
467	Benzene,Trimethyl,Isomer	925	1.25	0.5 ppb
479	Silicone	834	0.99	
495	Dichlorobenzene(Isomer)	931	2.15	1.12 ppb
511	Benzene(Trimethyl),Isomer	761	0.35	0.14 ppb
528	Unknown	574	0.13	
550	Benzeneacetaldehyde-Me	936	0.16	
556	C ₄ Benzene	592	0.4	3.79 ppb
592	C ₄ Benzene(Me-MethylEthyl)	764	0.19	1.85 ppb
609	Hydrocarbon C ₁₁	930	0.74	
617	Unknown	356	0.30	
629	Unknown	410	0.11	
633	C ₄ Benzene(Isomer) Ethyl Di Methyl	795	0.17	1.64 ppb
667	C ₄ Benzene(Isomer) Ethyl Di Methyl	687	0.22	2.11 ppb
672	Silicone	687	0.10	
701	Naphthalene	835	0.16	
713	Hydrocarbon C ₉	810	0.35	
727	1-Hexene,3,3,5- Trimethyl	788	0.16	
803	Hydrocarbon C ₈	848	0.17	

TABLE 9

QUANTITATION MATRIX

<u>Component</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
Toluene	86.5	59.7	94.9 ng	6.05	ND	23.1	22.4	15.5
Xylene(Isomer)	25.6	32.6	30.8 ng	2.35	3.84	4.49	3.1	5.48
C ₃ Benzene (MethylEthyl)	0.82	ND	1.8 ng	ND	ND	0.55	0.11	0.50
C ₃ Benzene (Trimethyl)	ND	ND	ND	ND	ND	0.40	0.33	0.14
Napthalene	0.38	0.44	ND	ND	ND	0.14	ND	ND
Dichlorobenzene	2.75	2.40	6.8 ng	0.38	0.43	1.14	0.85	1.12
Benzaldehyde	ND	ND	ND	0.80	ND	ND	ND	ND
C ₄ Benzene (DimethylEthyl) Isomer	ND	ND	ND	ND	ND	2.16	0.05	3.79
C ₄ Benzene (Methyl,Methyl- Ethyl)	ND	ND	ND	ND	ND	2.16	ND	1.85
C ₄ Benzene (Tetramethyl)	ND	ND	ND	ND	ND	0.03	ND	1.64
C ₄ Benzene (Ethyl dimethyl) Isomer	ND	ND	ND	ND	ND	3.04	ND	2.11

TABLE 9

Component	QUANTITATION MATRIX							
	↓ 406 goose neck 1 vent	405 goose neck 2 vent	406 goose neck 3 vent	Firehall 4	(closet) catholic school 5	Public school 6	Central school 7	upward 8
Toluene	.38 ppb	.26 ppb	108 ng	26 ppt	-	.1 ppb	.1 ppb	.7 ppb
Xylene (Isomer)	.13 ppb	.16 ppb	35 ng	11 ppt	19 ppt	20 ppt	10 ppt	30 ppt
C ₃ Benzene (MethylEthyl)	* 4 ppt	-	1.5 ng	-	-	3 ppt	.6 ppt	-
C ₃ Benzene (Trimethyl)	-	-	-	-	-	.06 ppb	1.8 ppt	3 ppt
Napthalene	2 ppt	2 ppt	-	-	-	.8 ppt	-	-
Dichlorobenzene	13 ppt	10 ppt	4.7 ng	1.8 ppt	20 ppt	5 ppt	4 ppt	5 ppt
Benzaldehyde	-	-	-	3.3 ppt	-	-	-	-
C ₄ Benzene (DimethylEthyl) Isomer	-	-	-	-	-	10 ppt	-	10.4 ppt
C ₄ Benzene (Methyl,Methyl- Ethyl)	-	-	-	-	-	10 ppt	-	11.7 ppt
C ₄ Benzene (Tetramethyl)	-	-	-	-	-	.1 ppt	.3 ppt	-
C ₄ Benzene (Ethyl dimethyl) Isomer	-	-	-	-	-	.2 ppb	-	13.3 ppt



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 848-5550 • TELEX: 06-960496

October 18, 1984

Ms. Anne Koven
Upper Ottawa Street Landfill Office
20 Jackson St. W., Suite 412
Hamilton, Ontario
L8P 1L2

21

Re: Mann Testing File 841314
Sorbent Tube GC/MS Analysis
Landfill and Peripheral Sites

Dear Ms. Koven:

This report contains the analytical results from five sorbent tube samples that were collected on March 21 of this year. The sites sampled are listed as follows:

<u>Tube #</u>	<u>Location</u>	<u>Volume Sampled</u>
6	Goosenecks	2.8 L
9	Blessed Kateri School	4.2 L
8	Upwind	4.34L
7	Control	4.34L
10	Downwind	2.9 L

The gooseneck sample was collected by moving across and downwind of the 13 goosenecks until the desired sample volume was obtained. The upwind and downwind samples were taken at Limeridge Road west of the CNR tracks and at Unsworth Road. The Control site was Stonechurch and Upper Gage Streets.

Analysis of the samples was achieved using the Universal Automated Concentrator, Model 780, which thermally desorbs the trapped sample and passes the released organics through two additional concentrator traps. The latter trap, being of small bore, reduces the sample to a small concentrated plug prior to its introduction into the GC capillary column. After separation of the mixture of chemicals present, the final analysis is achieved by Mass Spectrometer.

The data thus obtained are matched with spectra contained in the U.S. Environmental Protection Agency, National Institute of Health computer library which has the spectra for some 33,000 compounds. The computer produces the three best matches for each compound in the sample and applies a numerical fit value or purity. A value of 750 is considered a reasonable match and the compound having the highest fit value is shown in the computer printout. Where a fit value is less than 750 the compound is listed as unknown and requires a further manual search in an attempt to establish a reasonable identification.

For each of the 5 samples in this study a separate list, independent of the computer listing, has been produced and is based strictly on manual examination of each individual spectra. From these listings, a matrix of the 5 samples has been made for comparison purposes and all areas have been equated to a 2.8 litre volume.

All of the data is included with this report for your examination and retention. If you have any questions, I would be pleased to hear from you.

Yours truly,

A handwritten signature in cursive script, appearing to read "W. Burgess".

W. (Bill) Burgess, B.Sc.
Manager, Occupational Health

WBB/jh,
Encl.

GOOSENECKS

Sorbent Tube 6

MS File Q1441

<u>Scan</u>	<u>Identification</u>
345,365	Hydrocarbon
378,406	Hydrocarbon
424	Unknown
443,469	Hydrocarbon
480	Trimethyl Cyclohexane
493,512	Hydrocarbon
523	Dichloromethane
545	Benzene + Hydrocarbon
564,576	Unknown
591	Hydrocarbon
599	Unknown
606	Hydrocarbon (unsat)
622	Unknown
653	Toluene
667	Hydrocarbon (unsat)
675	4-Methyl-1-(methylethyl)Cyclohexane
694	Hydrocarbon
705	Undecadiene
715	2-Dodecanal
729	Trimethyl,3-Octyne
739	Methyl decene
746	Hydrocarbon (unsat)
759	Ethylbenzene
770,781	Xylene
817	C ₃ Benzene
835	Xylene
849	Hydrocarbon (unsat)
863	Propyl benzene
883,906	C ₃ Benzene
927	C ₃ Benzene
936	C ₄ Benzene
951	C ₃ Benzene
961	4-Carene
973,985	C ₄ Benzene
997,1005	C ₄ Benzene
1017	C ₃ Benzene
1038-1047	C ₄ Benzene
1059	Bromocyclopropyl Benzene
1095-1110	C ₄ Benzene
1128	Dichlorobenzene
1170	2,3-Dihydro-1-Methyl Indene
1178	C ₄ Benzene
1196	Unknown
1208	Benzoylchloride
1225	Tetrahydronaphthalene
1333	Unknown
1449	Naphthalene

BLESSED KATERI SCHOOL

Sorbent Tube #9

MS File Q1439

<u>Scan</u>	<u>Identification</u>
367	Freon 113, Hydrocarbon + Diethylether
403	Cyclohexane + Carbon Disulfide
436	Acetone
482	Ethyl Acetate
505	Silicone (System Contaminant)
518	Methylene chloride
541	Benzene
610	Chloroform
646	Toluene
665	1,2-Dichloroethane
697	Hydrocarbon
753	Ethylbenzene
763	m-Xylene
771	p-Xylene
871,940	C ₃ Benzene
1116	Dichlorobenzene
1158	Dichlorobenzene + unknown
1168	C ₄ Benzene
1196	Benzoylchloride
1321	1-Phenylethanone

UPWIND

Sorbent Tube 8

MS File Q1442

<u>Scan</u>	<u>Identification</u>
363	Diethylether + Freon 113 + Hydrocarbon
401	Cyclohexane
435	Acetone
455	Unknown
483	Ethyl Acetate
508	Silicone (system contaminant)
521	Dichloromethane
544	Benzene
615	Chloroform
650	Toluene
667	1,2-Dichloroethane
687	Hydrocarbon
753	Ethyl Benzene
764	Xylene
772	Xylene
782	Xylene
882,951	C ₃ Benzene
1063	Cycloheptanol
1128	Dichlorobenzene
1208	Benzoylchloride
1451	Naphthalene

CONTROL

Sorbent Tube #7

MS File Q1440

<u>Scan</u>	<u>Identification</u>
364	Diethylether, Freon 113 + Hydrocarbon
400	Cyclohexane + Unknown
434	Acetone
453	Unknown
480	Ethyl Acetate
504	Silicone (system contaminant)
517	Methylene Chloride
541	Benzene
610	Chloroform
645	Toluene
663	1,2-Dichloroethane
685,703	Hydrocarbon
767,774	Xylene
823	Hydrocarbon
944	C ₃ Benzene
1056	Heptanol
1120	Dichlorobenzene
1201	Benzoylchloride

DOWNWIND

Sorbent Tube #10

MS File Q1443

<u>Scan</u>	<u>Identification</u>
363	Hydrocarbon + Diethylether + Freon 113
399	Cyclohexane
429	Silicone (system contaminant)
452	Chlorobutane
479	Ethylacetate
503	Silicone (system contaminant)
516	Methylene Chloride
539	Benzene
608	Chloroform
643	Toluene
661	1,2-Dichloroethane
746	Ethylbenzene
756	Xylene
772	Xylene
824	Xylene
871, 939	C ₃ Benzene
1114	Dichlorobenzene
1166	C ₄ Benzene
1195	Benzoylchloride

Based on 2.8 L Sample Vol.

AREAS

SCAN	COMPONENT	GOOSE NECKS	BLESSED KATERI SCHOOL	UPWIND	DOWNWIND	STONECHURCH UPPERGAGE CTL.
345	Hydrocarbon	3005	-	-	-	-
364	Hydrocarbon	6339	-	-	-	-
367	Freon 113 + Diethyl Ether	-	765	743	722	139
378	Hydrocarbon	2768	-	-	-	-
403	Cyclohexane	-	376	460	392	306
406	Hydrocarbon	5930	-	-	-	-
424	Unknown	5457	-	27	-	49
436	Acetone	-	1516	2203	-	1465
443	Hydrocarbon	3323	-	-	-	-
452	Chlorobutane	-	-	-	25	-
469	Hydrocarbon	4657	-	-	-	-
480	Trimethyl Cyclohexane	678	-	-	-	-
482	Ethylacetate	-	414	352	315	415
493	Hydrocarbon	8511	-	-	-	-
505	Silicone	-	73	63	402	113
512	Hydrocarbon	2380	-	-	-	-
523	Dichloromethane	7944	2376	2642	2986	2407
545	Benzene + Hydrocarbon	7975	81	48	51	104
564	Unknown	902	-	-	-	-
576	Unknown	1433	-	-	-	-
591	Hydrocarbon	8117	-	-	-	-
599	Unknown	4035	-	-	-	-
606	Hydrocarbon (Unsat)	2624	-	-	-	-
610	Chloroform	-	175	253	189	216
622	Unknown	2331	-	-	-	-
653	Toluene	7625	392	404	264	321
665	Dichloroethane	-	19.0	29	24	46
667	Hydrocarbon (Unsat)	747	-	-	-	-
675	4-Methy-1-(1-Methylethyl)	-	-	-	-	-
	Cyclohexane	465	-	-	-	-
685	Hydrocarbon	-	-	-	-	99
694	Hydrocarbon	5101	92	101	-	57
705	Undecadiene	313	-	-	-	-
715	2-Dodecenal	556	-	-	-	-
729	Trimethyl, 3-Octyne	736	-	-	-	-
739	Methyl Decene	460	-	-	-	-
746	Hydrocarbon (Unsat)	103	-	-	-	-
759	Ethyl Benzene	8159	33	56	28	-
770	Xylene	12444	27	152	27	91
781	Xylene	27908	77	14.3	-	39
817	C3 Benzene	2073	-	-	-	-
823	Hydrocarbon	-	-	-	-	2.47
835	Xylene	17733	-	-	121	-
849	Hydrocarbon (Unsat)	502	-	-	-	-
429	Silicone	-	-	-	3620	-
863	Propyl Benzene	1397	39	-	-	-
883	C3 Benzene	7786	-	54	23	-
906	C3 Benzene	4604	53	-	-	-
927	C3 Benzene	2962	-	-	45	-
936	C4 Benzene	3226	-	-	-	-
951	C3 Benzene	7287	-	75	-	117
961	4-Carene	348	-	-	-	-
973	C4 Benzene	1256	-	-	-	-
985	C4 Benzene	320	-	-	-	-
997	C4 Benzene	847	-	-	-	-
1005	C4 Benzene	109	-	-	-	-
1017	C3 Benzene	2204	-	-	-	-
1029	C4 Benzene	343	-	-	-	-
1038	C4 Benzene	321	-	-	-	-
1047	C4 Benzene	506	-	-	-	-
1056	Heptenol	-	-	-	-	38
1059	2-Bromocyclopropyl Benzene	510	-	-	-	-
1063	Cycloheptanol	-	-	25	-	-
1095	C4 Benzene	143	-	-	-	-
1110	C4 Benzene	209	-	-	-	-
1128	Dichlorobenzene	5043	2471	2800	2429	3851
1170	2,3 Dihydro-1-Me Indene	50	-	-	-	-
1178	C4 Benzene	245	13	-	12	-
1196	Unknown	60	-	-	-	-
1206	Benzoylchloride	35	76	42	27	120
1225	Tetrahydronapthalene	55	-	-	-	-
1321	Phenylethanone	-	25	-	-	-
1333	Unknown	120	-	-	-	-
1449	Napthalene	335	-	14	-	-



return to A. Koven Report #4

MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 848-5550 • TELEX: 06-960496

December 31, 1984

21

Ms. Anne Koven
Upper Ottawa Landfill Site Office
20 Jackson St. W., Suite 412
Hamilton, Ontario
L8P 1L2

Dear Ms. Koven:

RE: **Mann Testing File# 841794**
Ambient Air Analysis-Landfill and Peripheral Sites

A total of six multisorbent tube samples were collected August 22, 1984, from the landfill and peripheral sites. The specific sampling locations were as follows:

<u>MS File</u>	<u>Sample#</u>	<u>Location</u>
Q1816	1 (1 L)	Goosenecks-Traverse 2 feet downwind
Q1817	2 (1.8 L)	Goosenecks-Traverse 4 feet downwind
Q1818	3 (4.2 L)	Downwind-Limeridge Rd E. of Upper Ottawa St.
Q1819	4 (4.2 L)	Upwind-Mount Albion Conservation Area
Q1820	5 (4.25 L)	School-Blessed Kateri Tekakwitha-roof
Q1821	6 (3.6 L)	Control-Upper Sherman Ave. at Stonechurch

N.B. Wind direction - South to Southwest.

The sorbent tubes were thermally desorbed using the Universal Automated Concentrator Model 780, and the released organics separated on a 30 meter WBOT (wide bore open tubular) capillary column. Final analysis was carried out using the Finnigan 3200 Mass Spectrometer. Temperature programming included a 5 minute hold at 40°C, then a gradient from 40-200°C at 10°C/minute.

Sample mass spectra are compared to the spectra contained in the EPA library of 40,000 compounds, and the three best matches for each component are displayed with the computer printouts. A purity, or numerical indication of fit is given for each of the three matches, and the identification criteria is based on a fit of 750 or better.

The quantitative standard was prepared by introducing 1.0 microliters of each target compound into 10 milliliters of methanol. From this standard solution, a 1 microliter quantity was injected directly onto a sorbent tube, similar to those used in the sample collections. The standard sorbent tube was then analysed in exactly the same manner as the samples.

The chromatogram for each of the samples is included with this report, along with the quantitative data, that is shown in part per billion concentrations.

In the following Table, all concentrations are reported in parts per billion concentrations, and have been equated to one liter sample volumes.

TABLE 1
QUANTITATIVE ANALYSIS RESULTS

ppb

<u>Contaminant</u>	Sample#/MS File					
	#1/Q1816	#2/Q1817	#3/Q1818	#4/Q1819	#5/Q1820	#6/Q1821
			<i>dimethyl</i>	<i>propyl</i>	<i>ethyl</i>	
Acetone	17.13	10.2	2.92	5.19	6.83	3.32
Diethyl Ether	3.54	1.82	0.58	0.83	0.62	1.14
Dichloromethane	12.55	6.12	2.01	3.4	3.92	4.17
Ethyl Acetate	3.03	1.39	ND	ND	ND	ND
Chloroform	2.03	0.75	0.26	0.36	0.53	0.72
Dichloroethane	ND	ND	ND	ND	ND	ND
Chlorobutane	0.34	0.06	ND	ND	ND	ND
Benzene	0.78	0.63	0.24	0.19	0.13	0.42
Cyclohexane	2.27	0.38	0.26	0.22	0.54	0.85
Toluene	2.66	1.43	0.44	0.63	0.59	0.91
Ethylbenzene	0.12	0.13	0.02	0.02	0.03	0.03
p & m-Xylene	0.44	0.36	0.03	0.04	0.15	0.07
o-Xylene	0.14	0.15	0.02	0.02	0.06	0.03
Trimethyl Benzene	0.01	0.18	0.01	0.02	0.01	0.10
Dichlorobenzene	1.02	0.65	0.1	0.39	0.43	0.4
Tetramethyl Benzene	ND	Trace	0.002	0.002	0.002	0.01
Naphthalene	0.03	0.03	ND	0.01	0.002	0.02

ND = None Detected

N.B. Compounds that are shown on the chromatograms, but are not included in the Table, were not quantitated.

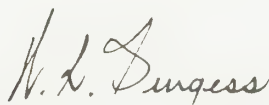
On the day that the above samples were collected, the Miran 1B Portable Infrared Analyzer was taken to the landfill site, and used to look at a number of contaminants such as Xylene, Toluene, Methane, Benzene, Tetrahydrofuran, and total hydrocarbons. Of interest was the rapid dispersion of contaminants, as evidenced by the significant drop in concentration when the instrument sampling probe was moved from the down pipe of the gooseneck, to a point 4 feet downwind. Concentrations in excess of 150 ppm and 200 ppm Xylene and Toluene, and greater than 400 ppm for methane, were found to drop below the instruments lower detection limit.

This was essentially the first field use of this instrument in Canada, and its portability and versatility provide just cause for optimism. Its use since the landfill study has been fairly extensive, and it has proven extremely valuable for use in indoor air quality studies. The instrument analyzer's memory contains a library for over 100 standard gases and vapours, and a separate memory capacity for up to 10 additional compounds of the operator's choice.

If you have any questions concerning this report, I would be pleased to hear from you.

Yours truly,

MANN TESTING LABORATORIES LTD.

A handwritten signature in dark ink, appearing to read 'W.R. Burgess', written in a cursive style.

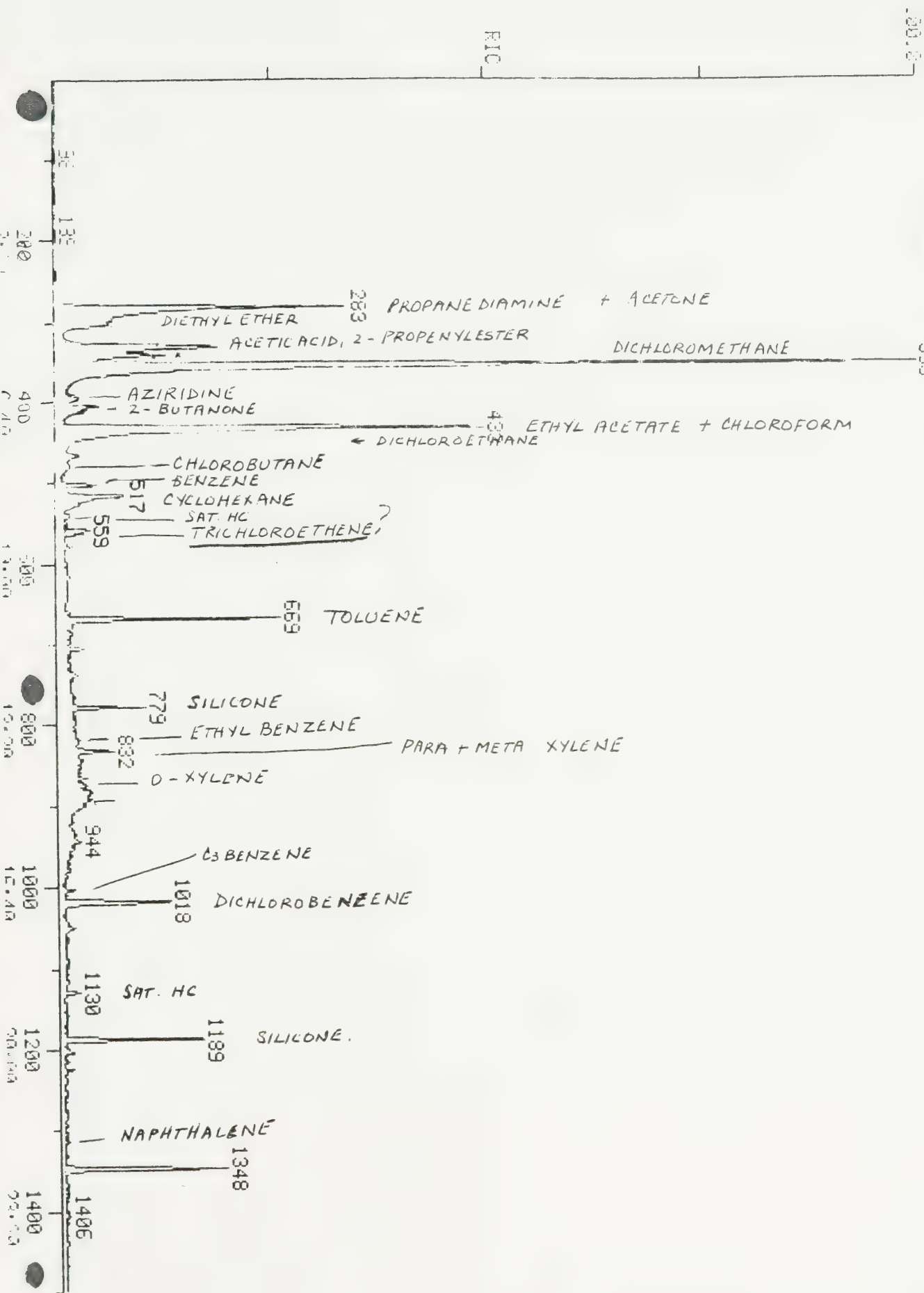
W.R. Burgess, B.Sc.
Manager, Occupational Health

R1C
 08/31/84 11:36:06
 SAMPLE: 1.0 L G005NECK SAMPLE (14 MIN)
 RANGE: C 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 1816 #1439
 CALL: Q1682 #5

SCANS 1 TO 1500

426496

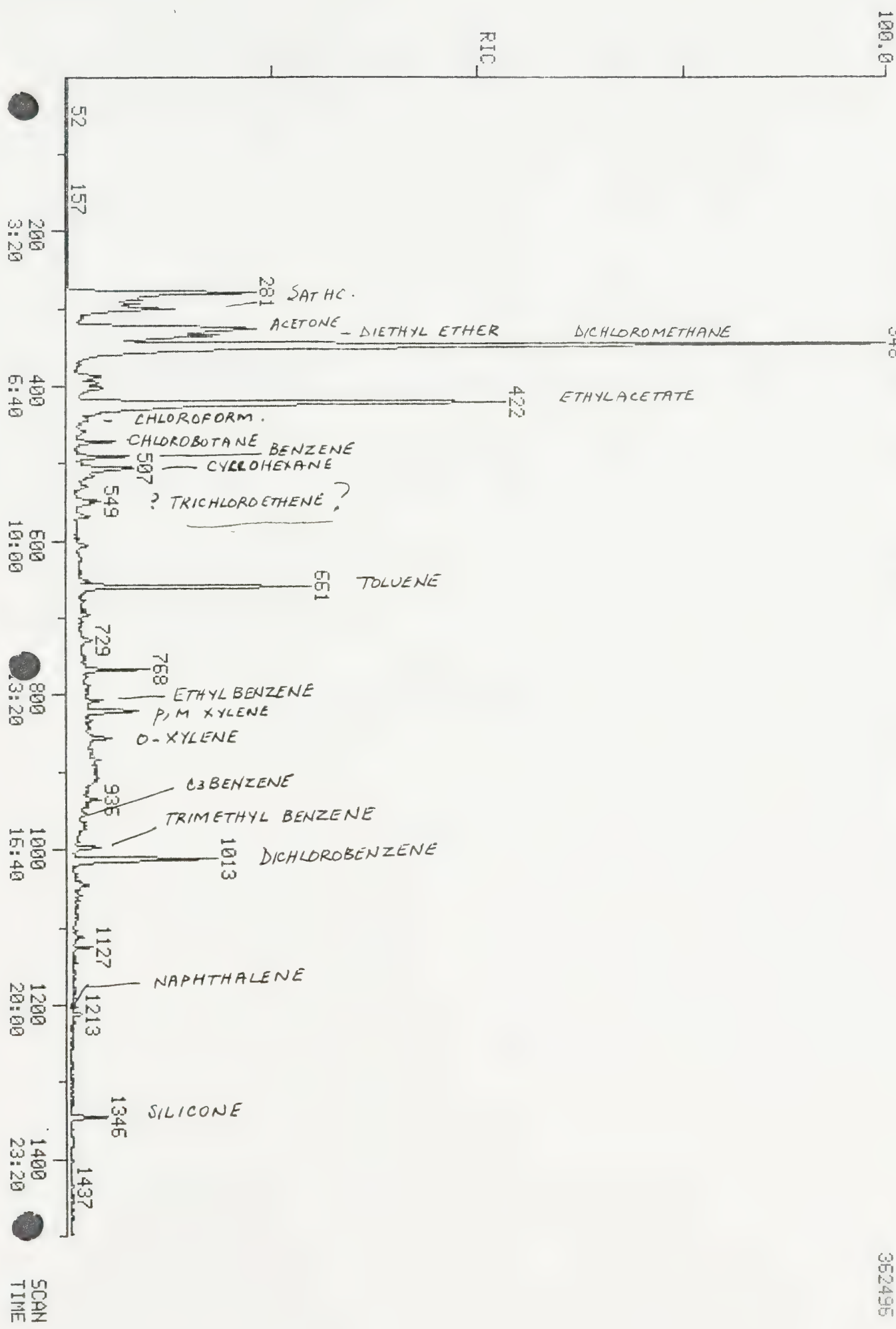


SCAN
 TIME

RIC
 08/31/84 12:48:00
 SAMPLE: 1.8 L GOOSENECK SAMPLE (25 MIN)
 RANGE: C 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 01817 #1378
 CALI: 01682 #5
 SCANS 1 TO 1500

100.0
362495



200
 3:20
 400
 6:40
 600
 10:00
 800
 13:20
 1000
 16:40
 1200
 20:00
 1400
 23:20
 SCAN TIME

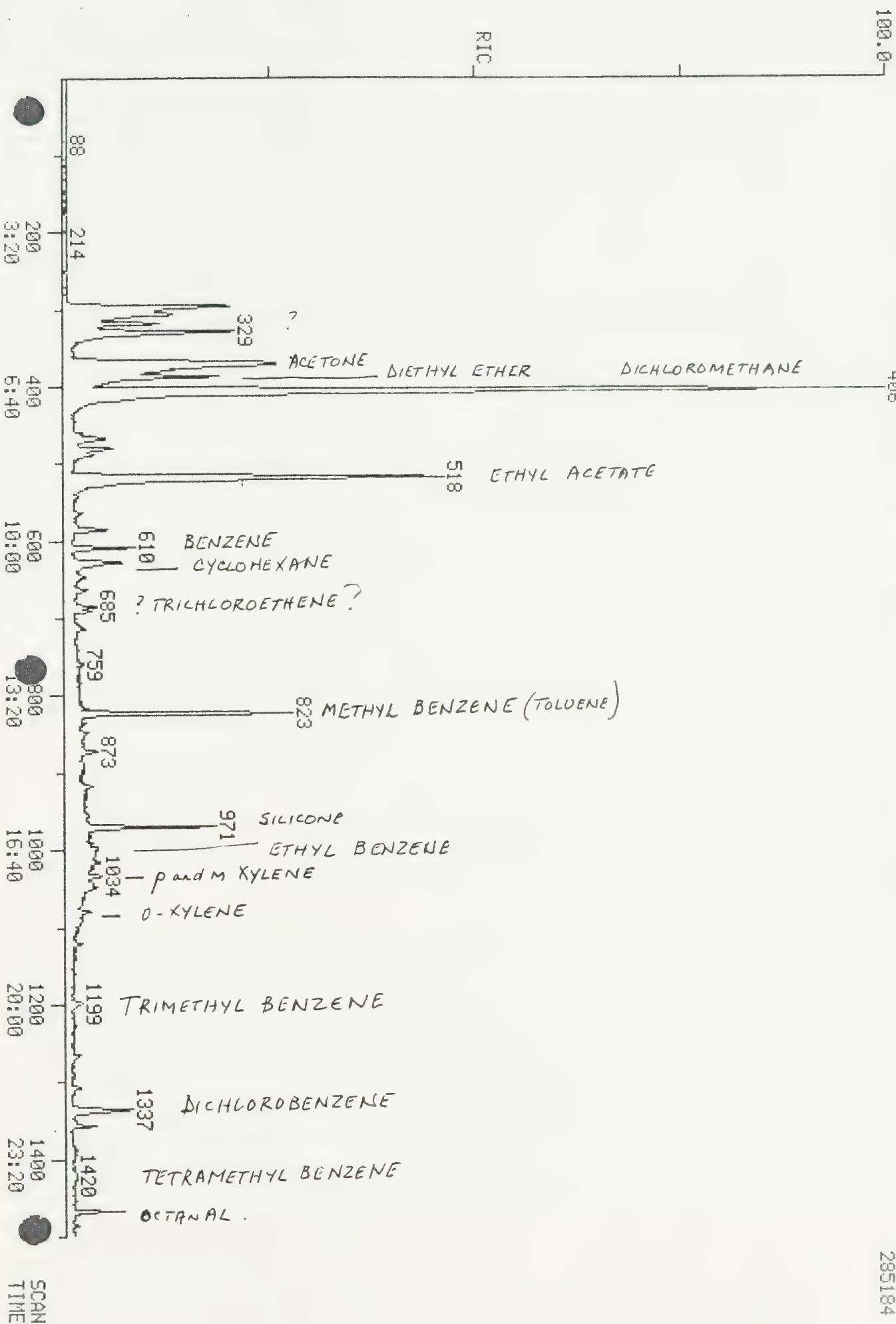
down

RIC
08/31/84 13:30:00
SAMPLE: 4.2 L DOWNMIND (LIMERIDGE)
RANGE: G 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 01818 #1485
CALI: 01682 #5

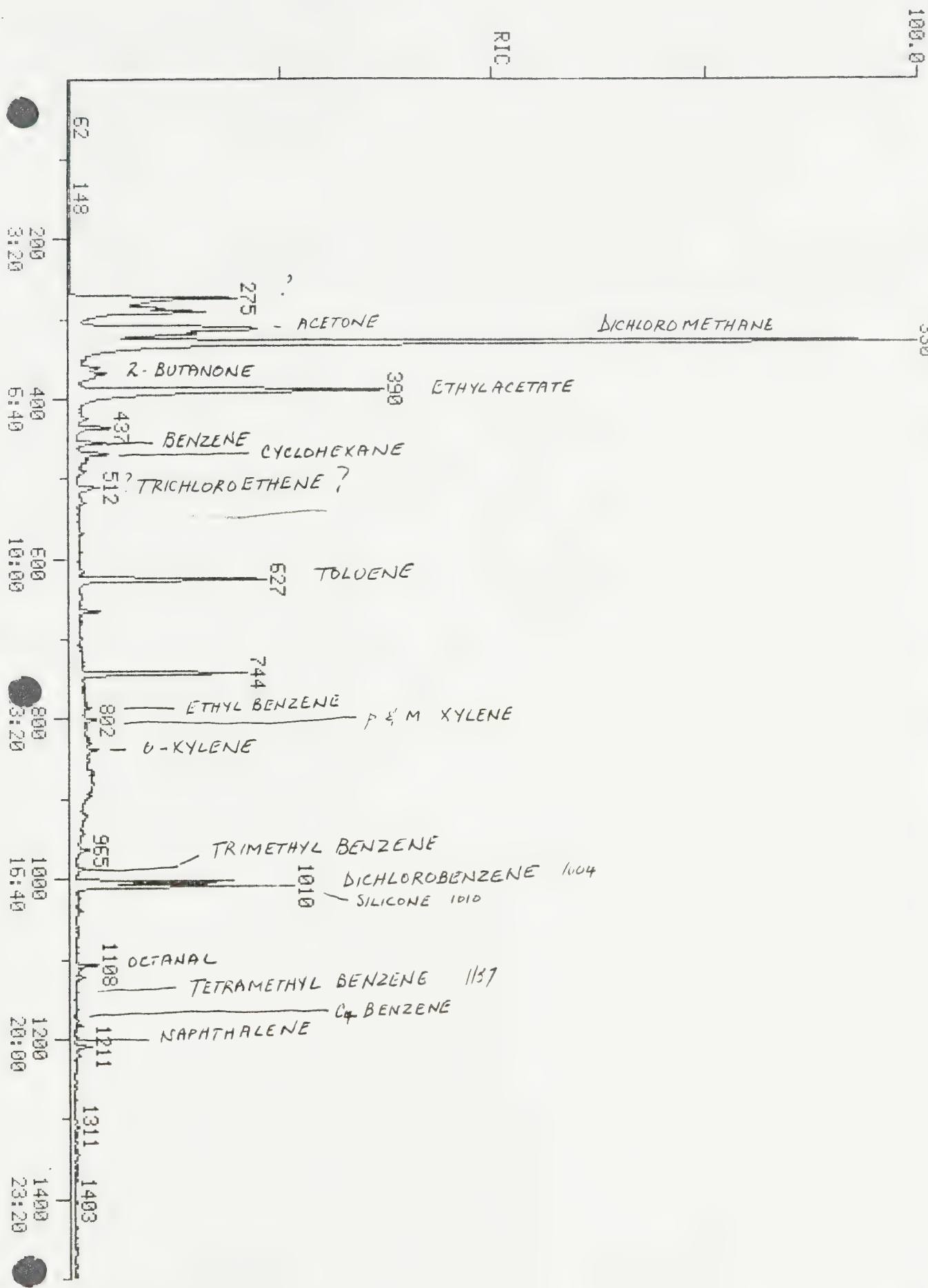
SCANS 1 TO 1500

285184



RIC
 08/31/84 14:18:00
 SAMPLE: 4.2 L UPWIND (CONSERVATION AREA)
 RANGE: C 1/1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 01819 #1467
 CALL: 01682 #5
 SCANS 1 TO 1500



478208

54
TIME

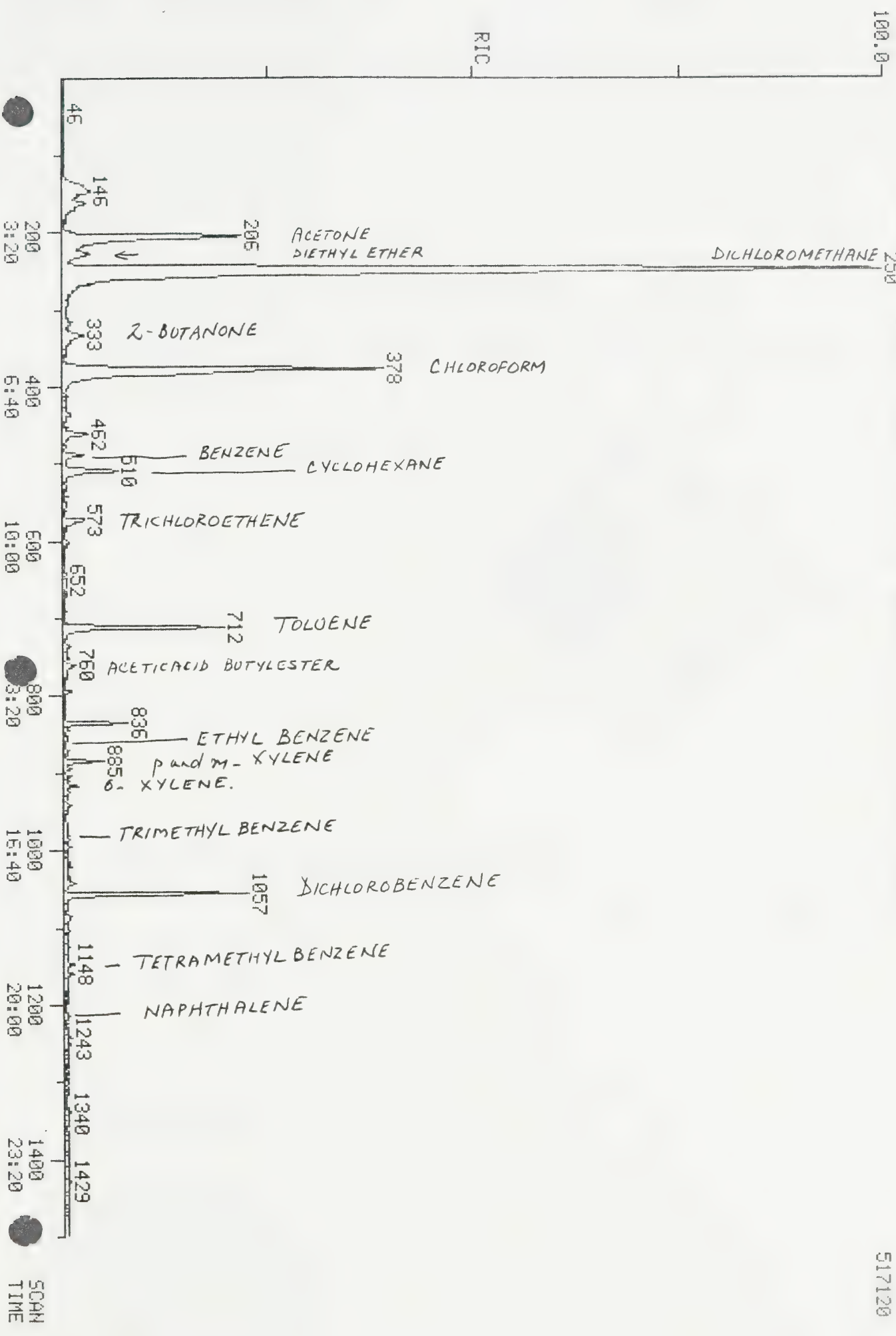
517120

RIC
08/31/84 15:04:00
SAMPLE: 4.25 L BLESSED KATERI SCHOOL
RANGE: 5 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 01820 #1493
CALL: 01682 #5

SCANS 1 TO 1500

517120



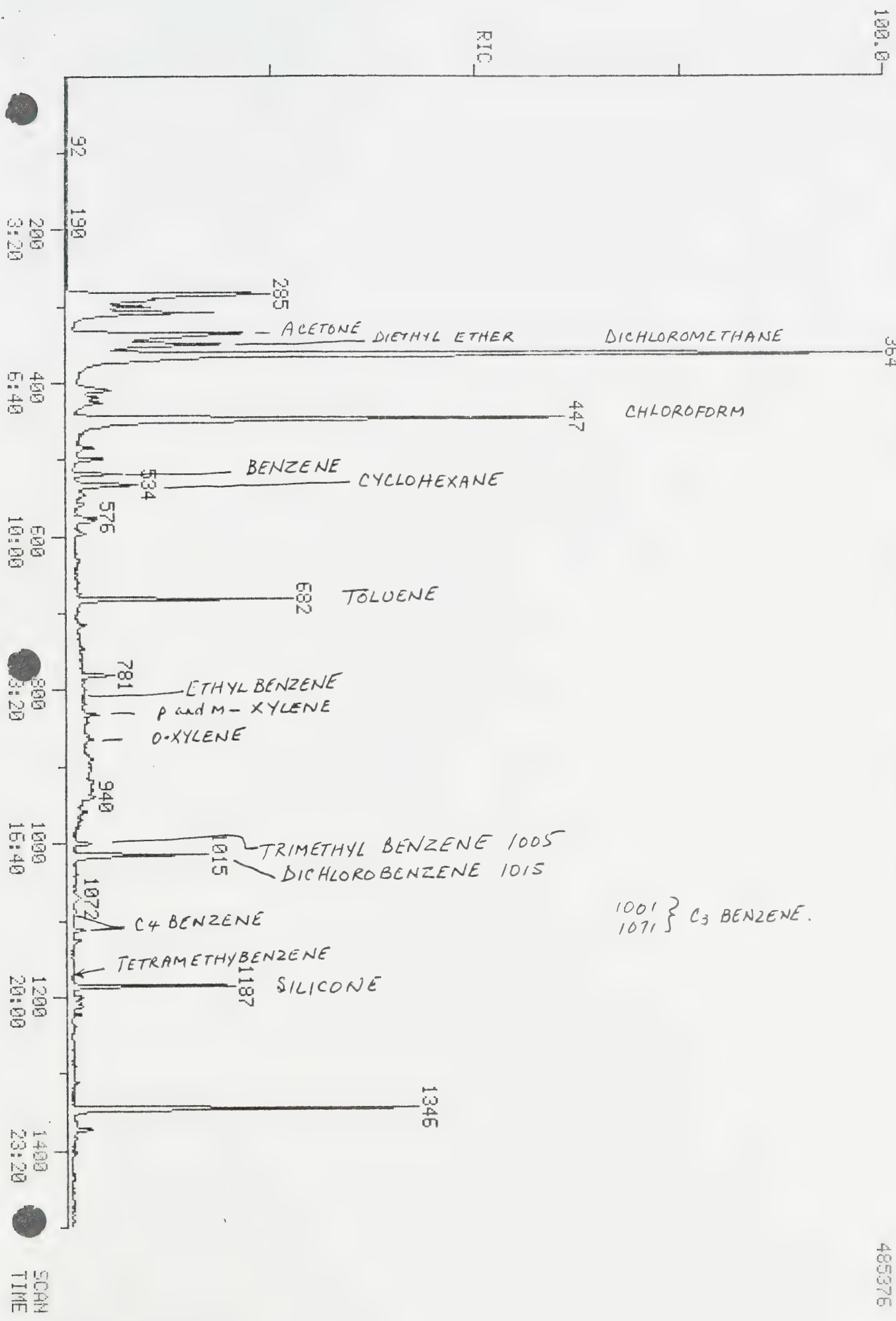
CONF

RIC
08/31/84 15:50:00
SAMPLE: 3.6 L CONTROL (CHURCH OF J. C.)
RANGE: G 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: Q1821 #1404
CALL: Q1682 #5

SCANS 1 TO 1500

485376





return to A. Koven

Report #5

21

MANN TESTING LABORATORIES LTD.
5550 Mc ADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 848-5550 • TELEX: 06-960496

January 21, 1985

Ms. Anne Koven
Upper Ottawa Landfill Site Office
20 Jackson St. W., Suite 412
Hamilton, Ontario
L8P 1L2

Re: **Mann Testing Files 842155 and 842224**
Ambient Air Analysis - Landfill and Peripheral Sites

Dear Ms. Koven:

A total of ten multisorbent tubes and two bag samples were collected November 22, 1984 and December 11, 1984, from the Upper Ottawa Landfill and peripheral sites. The specific sampling locations and sampling dates are as follows:

<u>MS File</u>	<u>Volume</u>	<u>Collection Date</u>	<u>Location</u>
Q2257	8.0 L	Dec. 11	Blessed Kateri School
Q2258	2.75 L	Nov. 22	Blessed Kateri School
Q2259	10.1 L	Dec. 11	Upwind-Mt. Albion Conservation Area
Q2260	0.2 L	Nov. 22	Upwind-Mt. Albion Conservation Area
Q2261	2.5 L	Nov. 22	Downwind-Soloman Street
Q2262	6.7 L	Dec. 11	Downwind-Limeridge/Upper Ottawa
Q2263	0.15 L	Nov. 22	Control-Church of Jesus Christ
Q2264	8.3 L	Dec. 11	Control-Route #53: <i>Byrna 1 near Upper Wellington</i>
Q2265	1.7 L	Nov. 22	Goosenecks-4 ft. downwind traverse
Q2275	-	Dec. 11	Gooseneck Offgas (directly inside pipe) - Bag Sample

Wind Direction on both days of sampling
was coming from the southeast.

The two bag samples were collected Dec. 11, 1984 from inside two goosenecks. They were analyzed qualitatively by Gas Chromatograph and the compounds found are listed below:

<u>Compound</u>	<u>Sample Bag#</u> <u>Gooseneck #</u>	<u>S-1</u> <u>9</u>	<u>S-18</u> <u>12</u>
1,1-Dichloroethane		X	X
Dichlorodifluoromethane	Free 22	ND	X
Chloroform		ND	X
Dichloromethane		X	X
Methane		X	X
Ethane/Ethylene		ND	X
Propane/Propylene		ND	X

The sorbent tubes were thermally desorbed using the Universal Automated Concentrator Model 780, and the released organics separated on a 30 meter WBOT (wide bore open tubular) capillary column. Final analysis was carried out using the Finnigan 3200 Mass Spectrometer. Temperature programming included a 5 minute hold at 40°C, then a gradient from 40-200°C at 10°C/minute.

Sample mass spectra are compared to the spectra contained in the EPA library of 40,000 compounds, and the three best matches for each component are displayed with the computer printouts. A purity, or numerical indication of fit is given for each of the three matches, and the identification criteria is based on a fit of 750 or better.

The quantitative standard was prepared using the static bottle method. This method consists of a cocktail of pure compounds, of which 5 ul is injected into a precleaned 4 l jug equipped with a septum cap. The jug is heated to 60°C and a 1 ml sample is taken and immediately injected onto a sorbent tube, similar to those used in the sample collection.

The chromatogram for each of the samples is included with this report, along with the quantitative data, that is shown in part per billion concentrations.

In the following Table, all concentrations are reported in parts per billion concentrations.

TABLE 1
November 22, 1984 Sampling

COMPOUND	Q2265 Gooseneck (ppb)	Q2258 School (ppb)	Q2261 Downwind (ppb)	Q2260 Upwind (ppb)	Q2263 Control (ppb)
Dichloromethane	1.53	ND	ND	ND	ND
Acetone	19.93	16.73	7.63	Detected	Detected
1,1-Dichloroethane	ND	ND	ND	ND	ND
1,2-Dichloroethylene	ND	ND	ND	ND	ND
Chloroform	1.09	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	0.19	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND
Benzene	3.03	1.85	1.00	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND
Toluene	16.42	2.77	1.36	Detected	Detected
Tetrachloroethylene	ND	ND	ND	ND	ND
Ethyl Benzene	0.16	ND	ND	ND	ND
m+p-Xylene	0.80	0.19	0.21	ND	ND
o-Xylene	0.20	0.05	ND	ND	ND
Styrene	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
n-Hexane	ND	ND	ND	ND	ND

N.B. The upwind and control samples were not quantitated due to sampling difficulties.

TABLE 2

December 11, 1984 Sampling

COMPOUND	Q2257 School	Q2262 Downwind	Q2259 Upwind	Q2264 Control	Q2275 Gooseneck Offgas *
Dichloromethane	0.46	0.35	ND	ND	970.0
Acetone	ND	ND	ND	2.39	540.0
1,1-Dichloroethane	ND	ND	ND	ND	520.0
1,2-Dichloroethylene	ND	ND	ND	0.13	ND,,
Chloroform	0.09	ND	ND	ND	60.0
1,1,1-Trichloroethane	0.67	0.13	0.35	0.30	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND
Benzene	2.92	4.70	2.28	39.55	940.0
Trichloroethylene	ND	ND	ND	ND	ND
Toluene	2.65	1.96	15.91	5.24	13720.0
Tetrachloroethylene	0.22	ND	ND	ND	ND.
Ethyl Benzene	0.42	0.51	0.19	0.13	7800.0
m+p-Xylene	1.15	0.96	0.37	1.21	22280.0
o-Xylene	0.50	0.32	0.57	0.44	5420.0
Styrene	ND	ND	ND	0.15	ND
1,3-Dichlorobenzene	0.81	ND	ND	0.56	ND
n-Hexane	ND	ND	ND	ND	ND

ND = None Detected

N.B. = Compounds that are shown on the chromatograms, but are not included in the Table, were not quantitated.

* = Bag Sample S-18 from Gooseneck #12

Refer to Table 1 (November 22, 1984).

After the sampling was completed the pumps were retested for flow rate. The pump, 0123 used to collect the Upwind and Control samples, was found to be vastly different from the presampling value. Since the volume of air sampled was unknown, quantitation of the samples was not calculated, and only a qualitative analysis was completed.

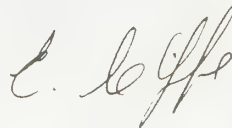
Refer to Table 2 (December 11, 1984).

Since the gooseneck sample was lost due to instrument malfunction, one of the bag samples S-18 was used as a substitute. The concentrations found were higher than might normally be expected, but this can be attributed to the method used for sample collection, i.e. directly from the downpipe of the gooseneck. The Control sample contained a relatively higher amount of benzene which may have been caused by the highway traffic in the area.

Upon comparing the two sets of samples, the major difference is the additional compounds found in the December 11, 1984 sampling, which is attributed to the larger sample volumes taken at that time. Larger sample volumes will be common practice for future sampling.

If you have any questions regarding this report or the data, I would be pleased to hear from you.

Yours truly,

A handwritten signature in cursive script, appearing to read 'E. Cliffe'.

E. Cliffe (Miss)
Occupational Health Department

EC/jh

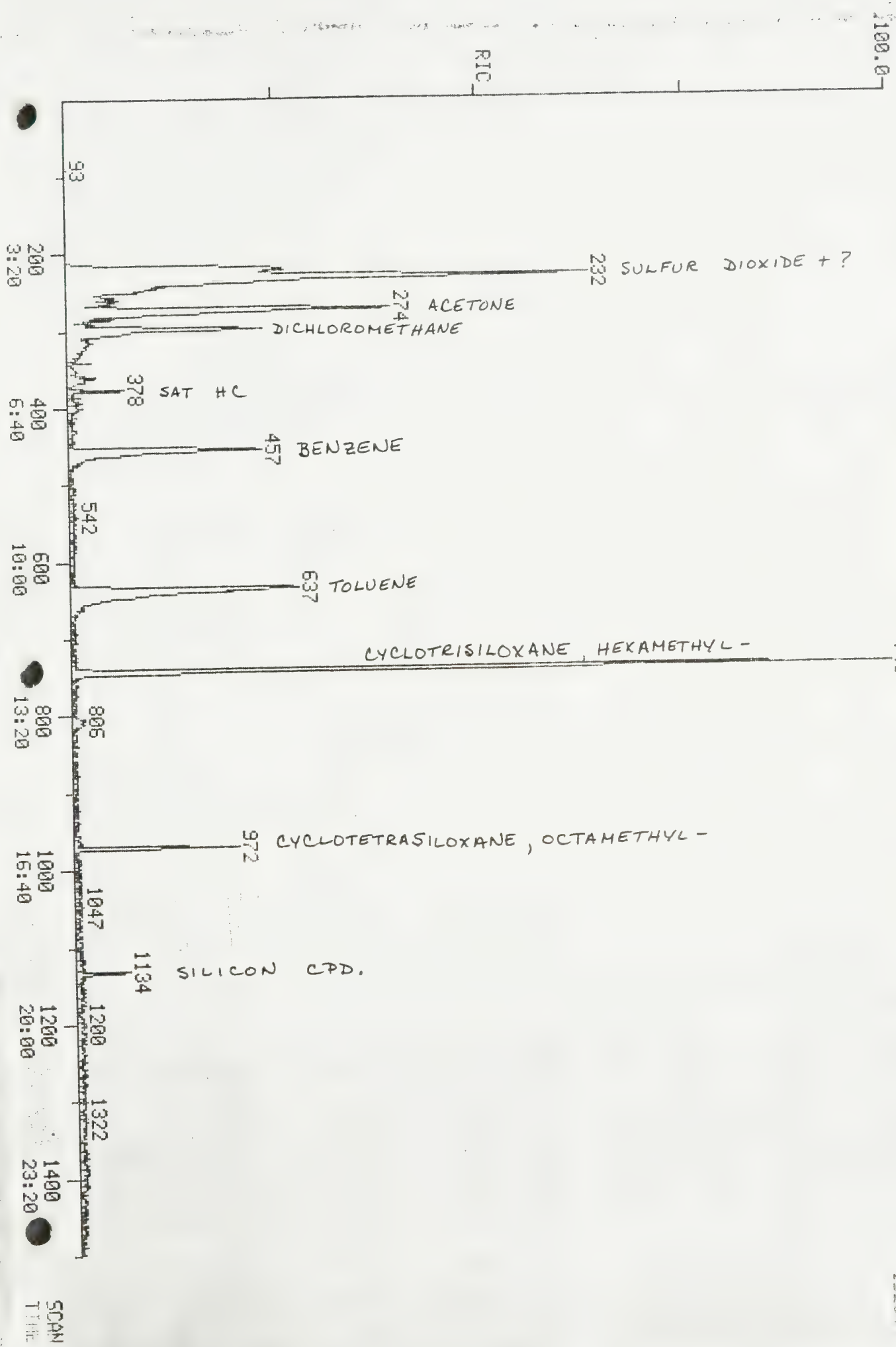
School - Nov

RIC
12/19/84 10:34:00
SAMPLE: SORBENT TUBE #19 - BLESSED KATERI SCHOOL (2.75L)
RANGE: G 1.1500 LABEL: N 0, 4.0 QUANT: A 0, 1.0 BASE: U 20, 3

DATA: 02258 #972
CALL: 02185 #5

SCANS 1 TO 1500

19264



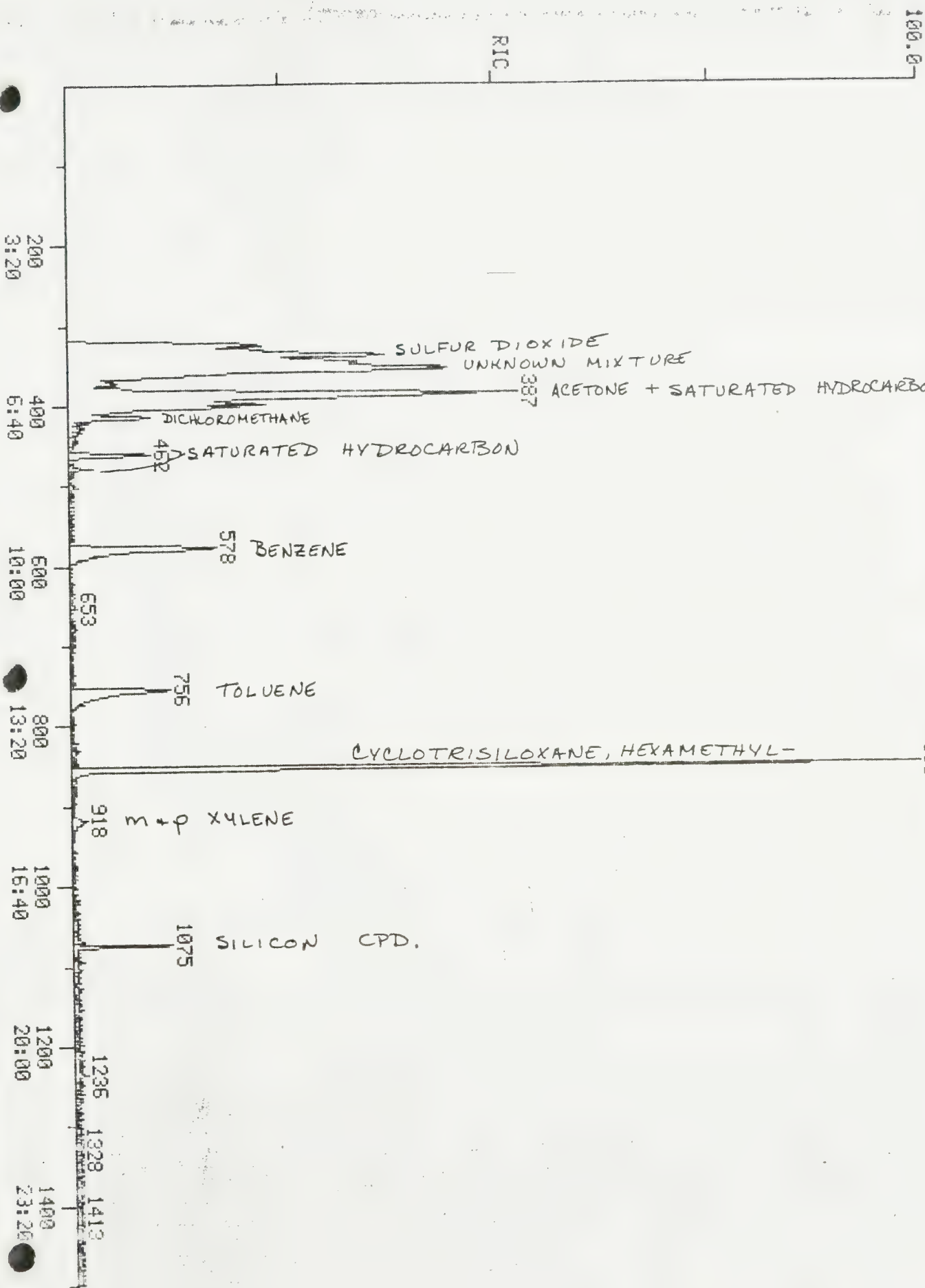
Downwind - Nov

RIC
12/19/84 13:00:00
SAMPLE: SORBENT TUBE #17 - DOWNWIND SOLOMAN ST. AREA (2.5L)
RANGE: C 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 02261 #1493
CALI: 02185 #5

SCANS 1 TO 1500

20751



500
TIME

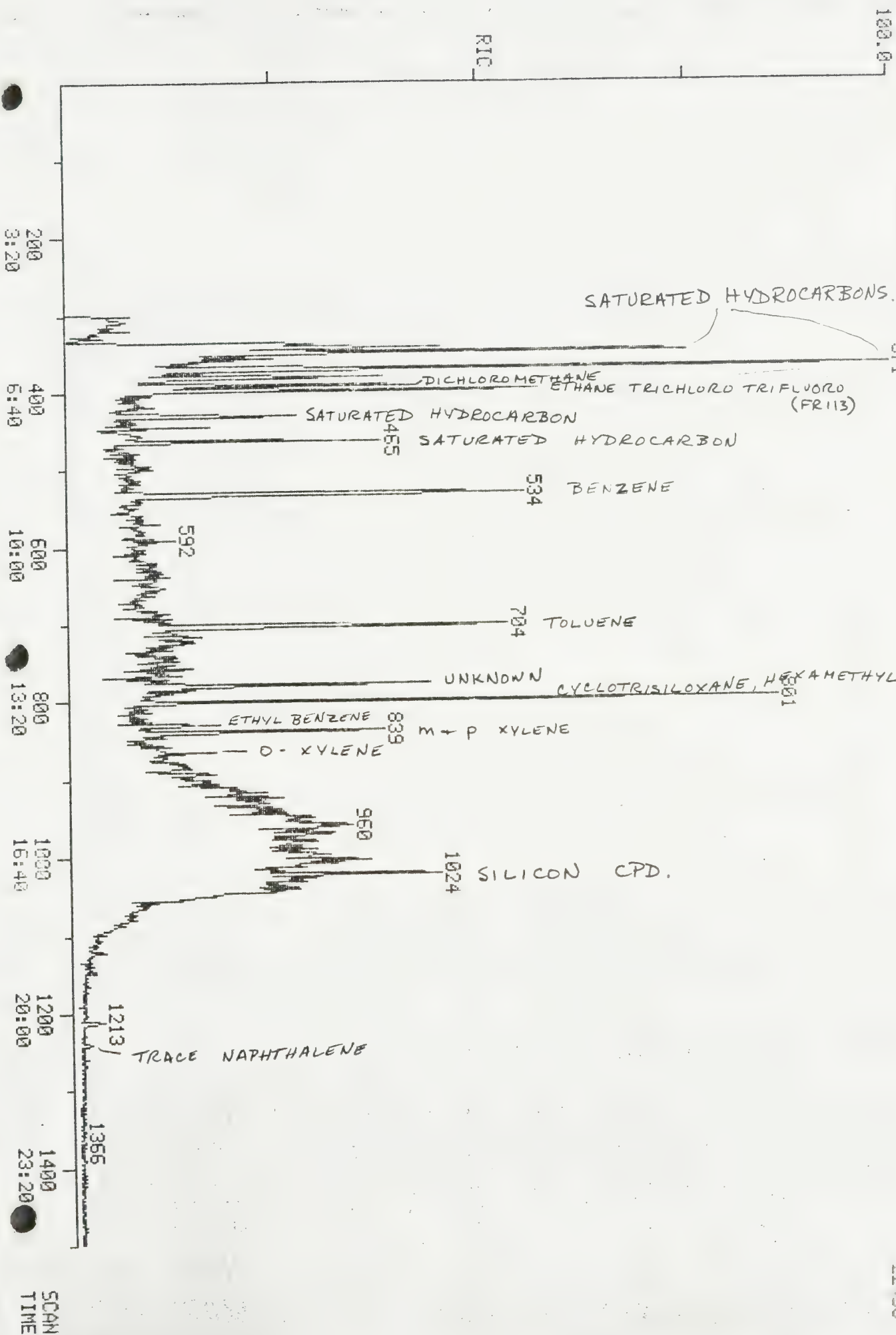
Downwind-Na

RIC
12/19/84 13:55:00
SAMPLE: SORBENT TUBE #2 - DOWNWIND LIMERIDGE UPPER OTTAWA
RANGE: G 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 02262 #995
CALI: 02182 #1

SCANS 1 TO 1500

22436



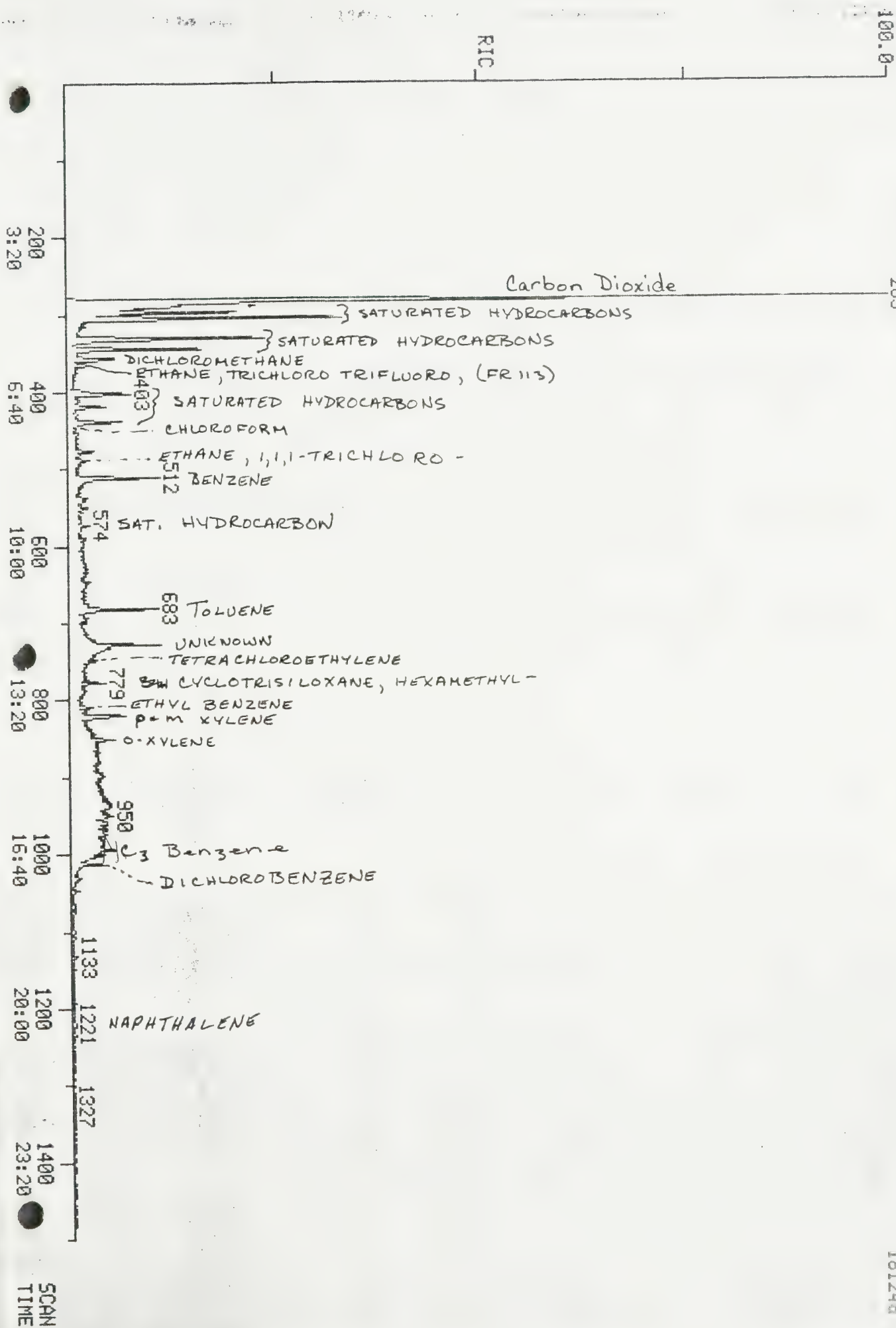
School = Dec

RIC
12/19/84 9:52:00
SAMPLE: SORBENT TUBE #13 - BLESSED KATERI SCHOOL (8L)
RANGE: C 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

181248

DATA: 02257 #1234
CALL: 02185 #5

SCANS 1 TO 1500

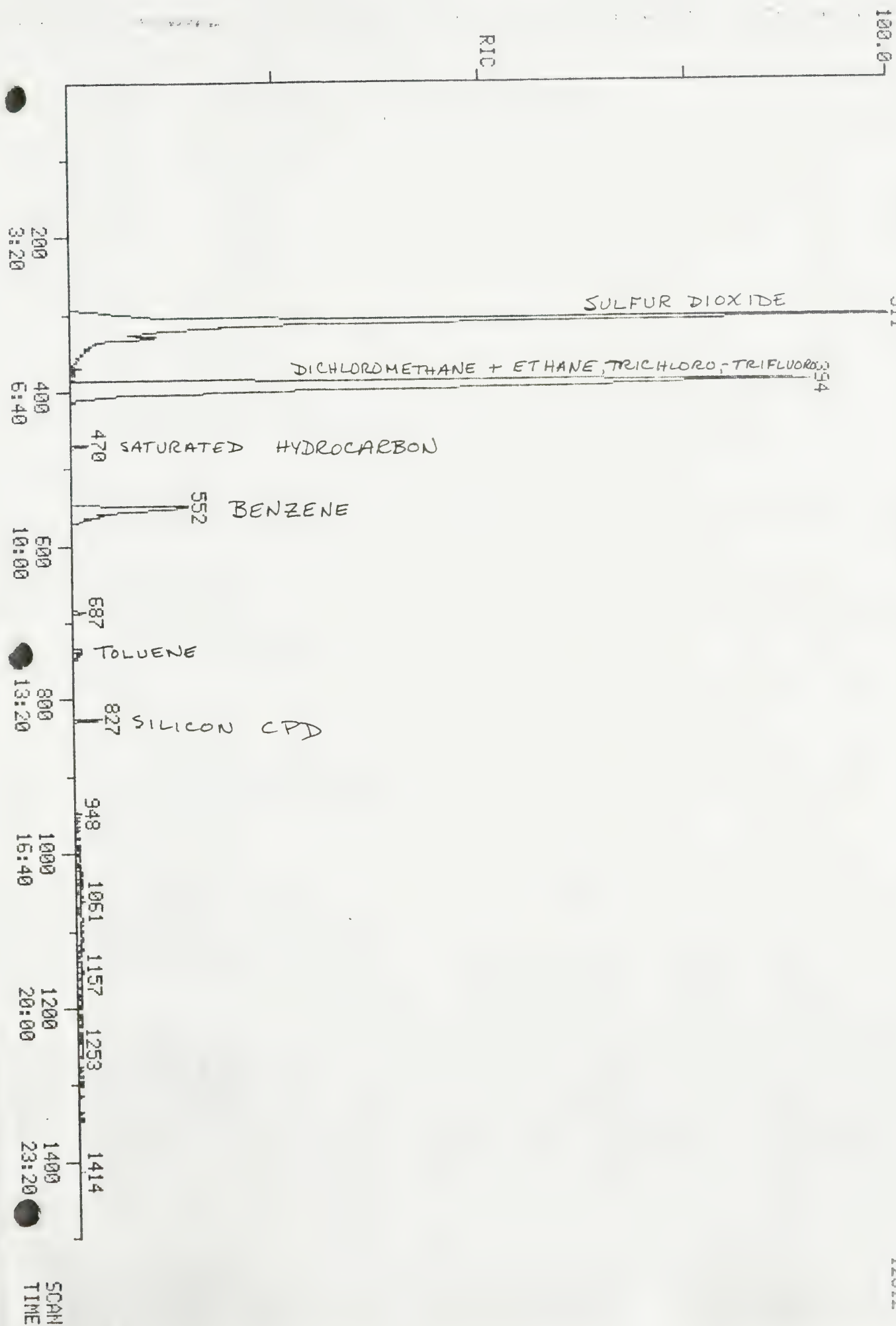


RIC
12/19/84 8:48:00
SAMPLE: SORBENT TUBE #25 - BLANK
RANGE: G 1,1500 LABEL: N 0, 4.0
QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 02256 #1344
CALI: 02185 #5

SCANS 1 TO 1500

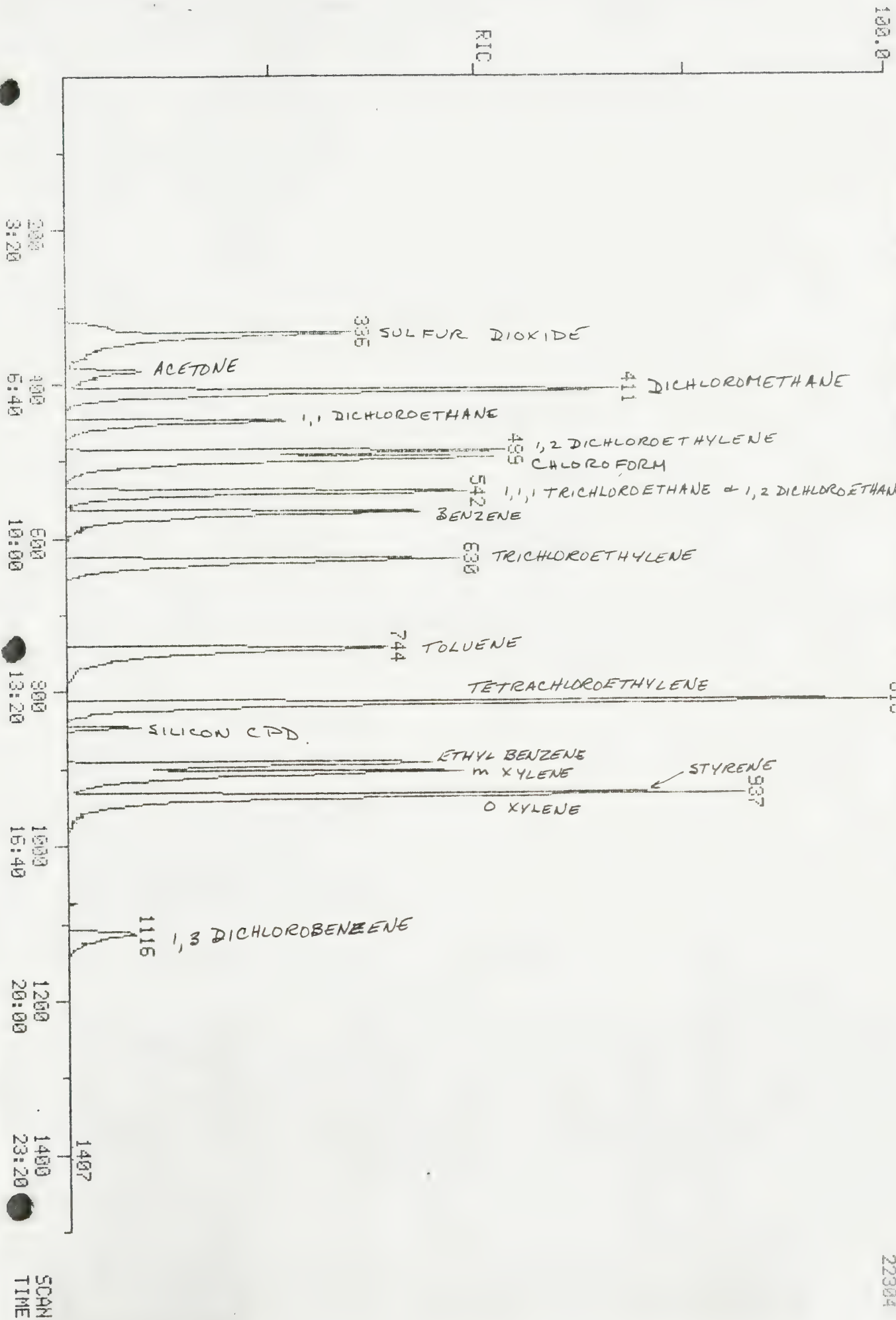
12512



RIC
 12:19:04 16:17:00
 SAMPLE: SUBMIT TUBE #4 - 1 ML OF 5 µL GAS STD. IN BOTTLE
 RANGE: 0 1.1500 LABEL: N 0, 4.0 SCAN: A 0, 1.0 BASE: U 20, 3
 DATA: 02274 #1142
 CALL: 02182 #1

22304

SCANS 1 TO 1500



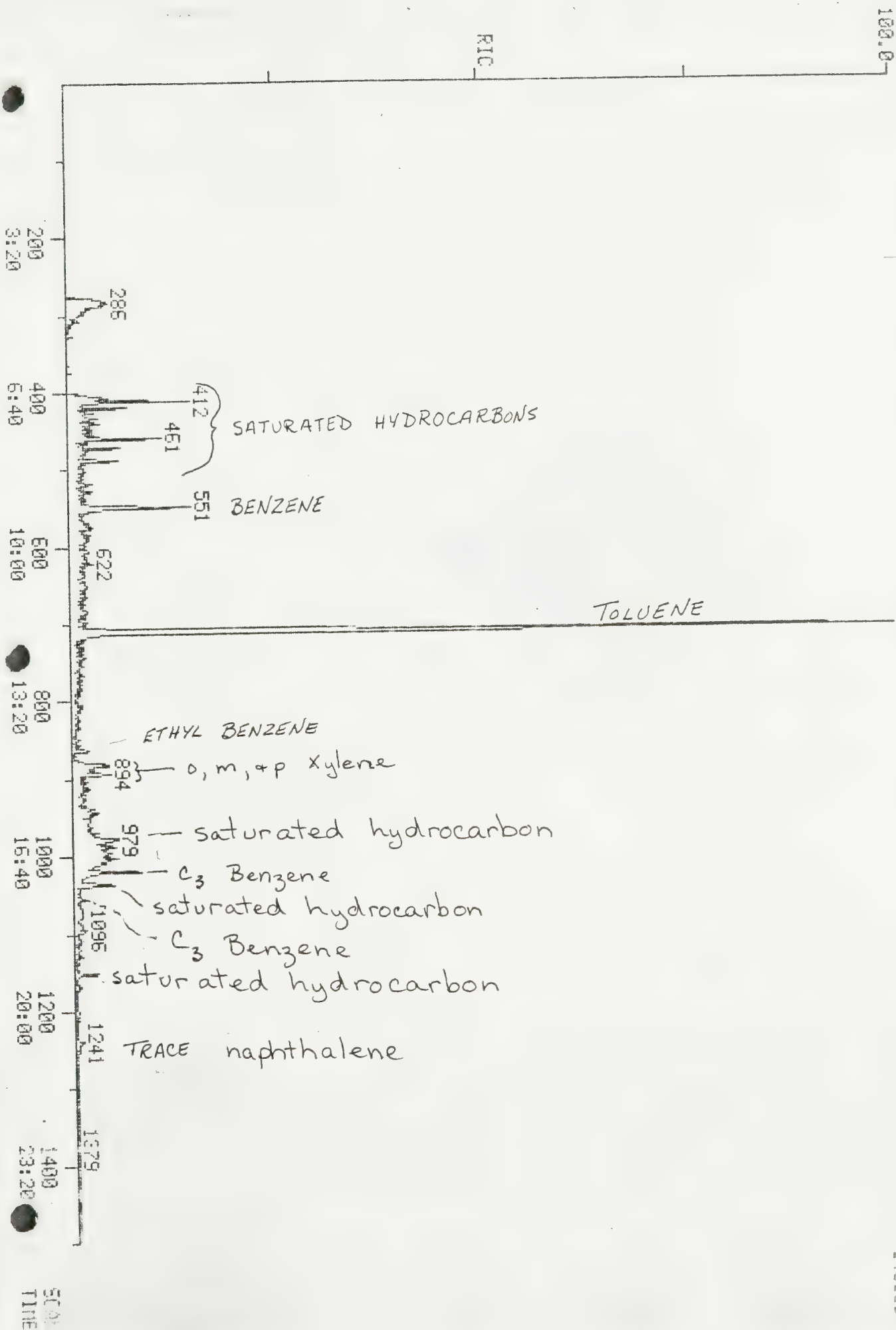
Upwind-Dec

RIC
12/19/84 11:15:00
SAMPLE: SORBENT TUBE #8 - UPWIND CONSERVATION AREA (10.1L)
RANGE: G 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 02259 #1252
CALL: 02185 #5

SCANS 1 TO 1500

143360



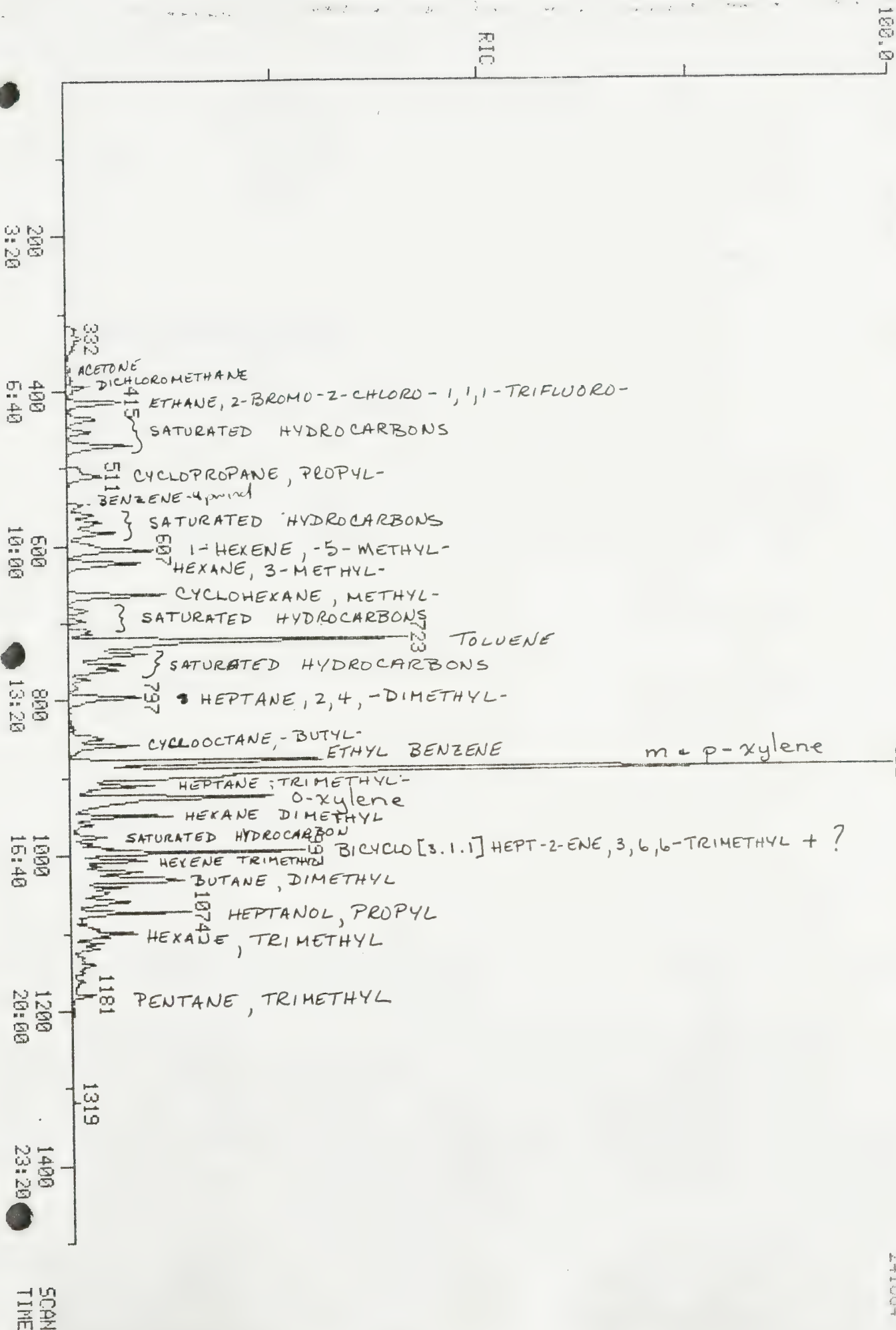
Goosehead-Dec

RIC
12/19/84 17:22:00
SAMPLE: 10 ML OF GOOSENECK OFFGAS
RANGE: C 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 02275 #1208
CALL: 02182 #1

SCANS 1 TO 1500

241664



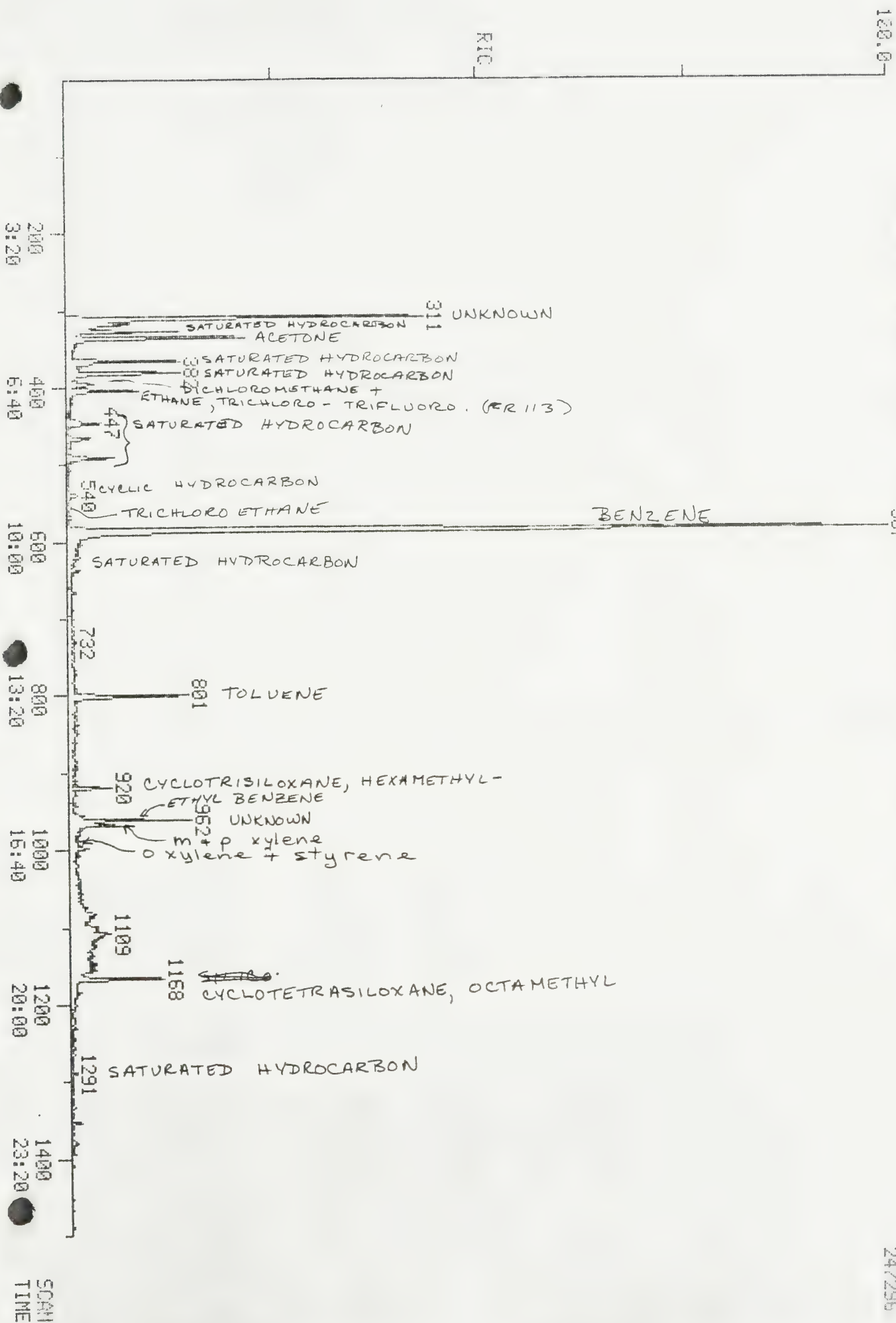
Control-Dec

RIC
12/19/84 15:23:00
SAMPLE: SORENT TUBE #5 - CONTROL - ROUTE #53 (8.3L)
RANGE: 0 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 02264 #999
CALL: 02185 #5

SCANS 1 TO 1500

247295



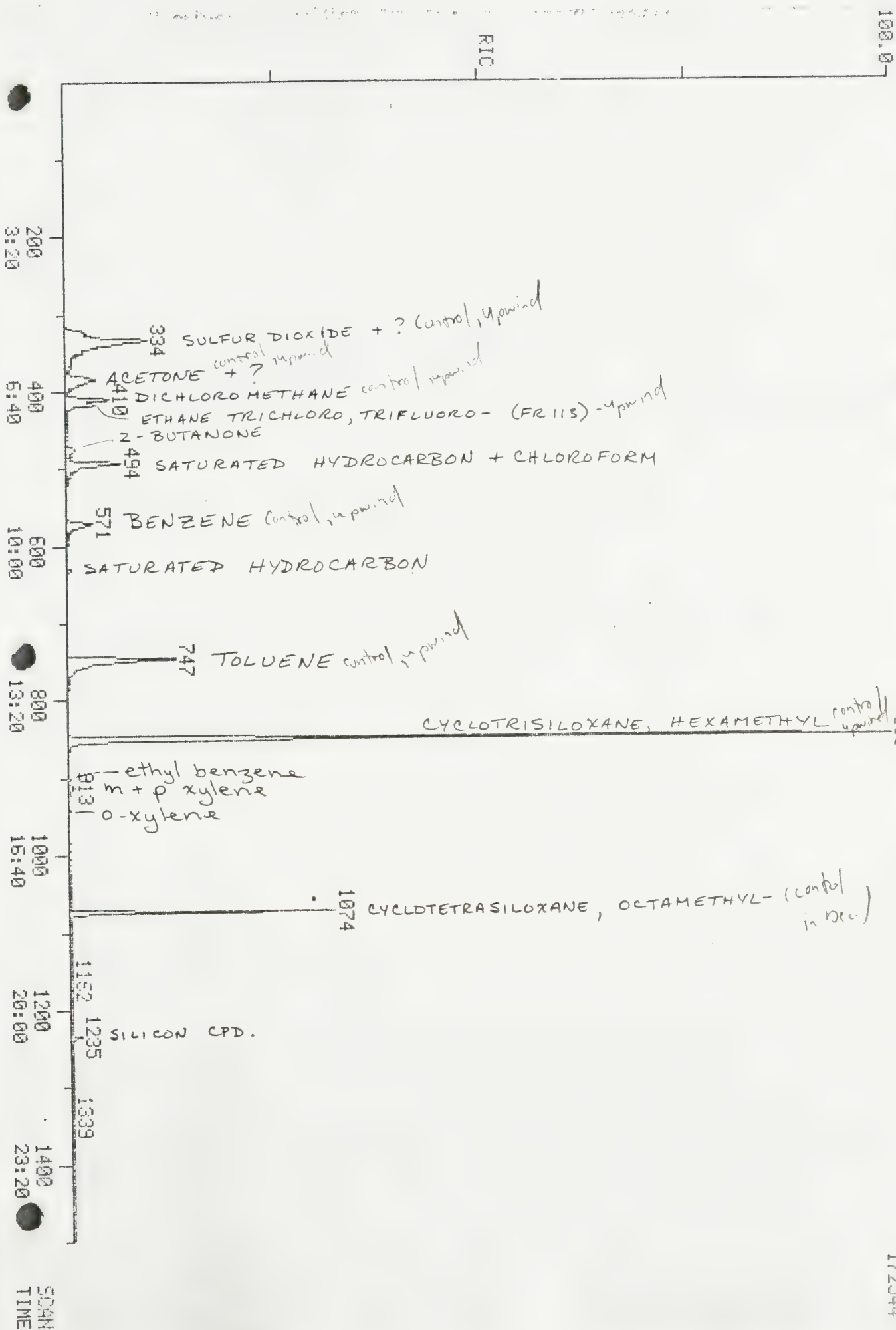
Gooseneck - ADON

RIC
12/19/84 16:03:00
SAMPLE: SORBENT TUBE #21 - GOOSENECK (1.7L)
RANGE: C 1.1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 02265 #1235
CALI: 02185 #5

SCANS 1 TO 1500

172544

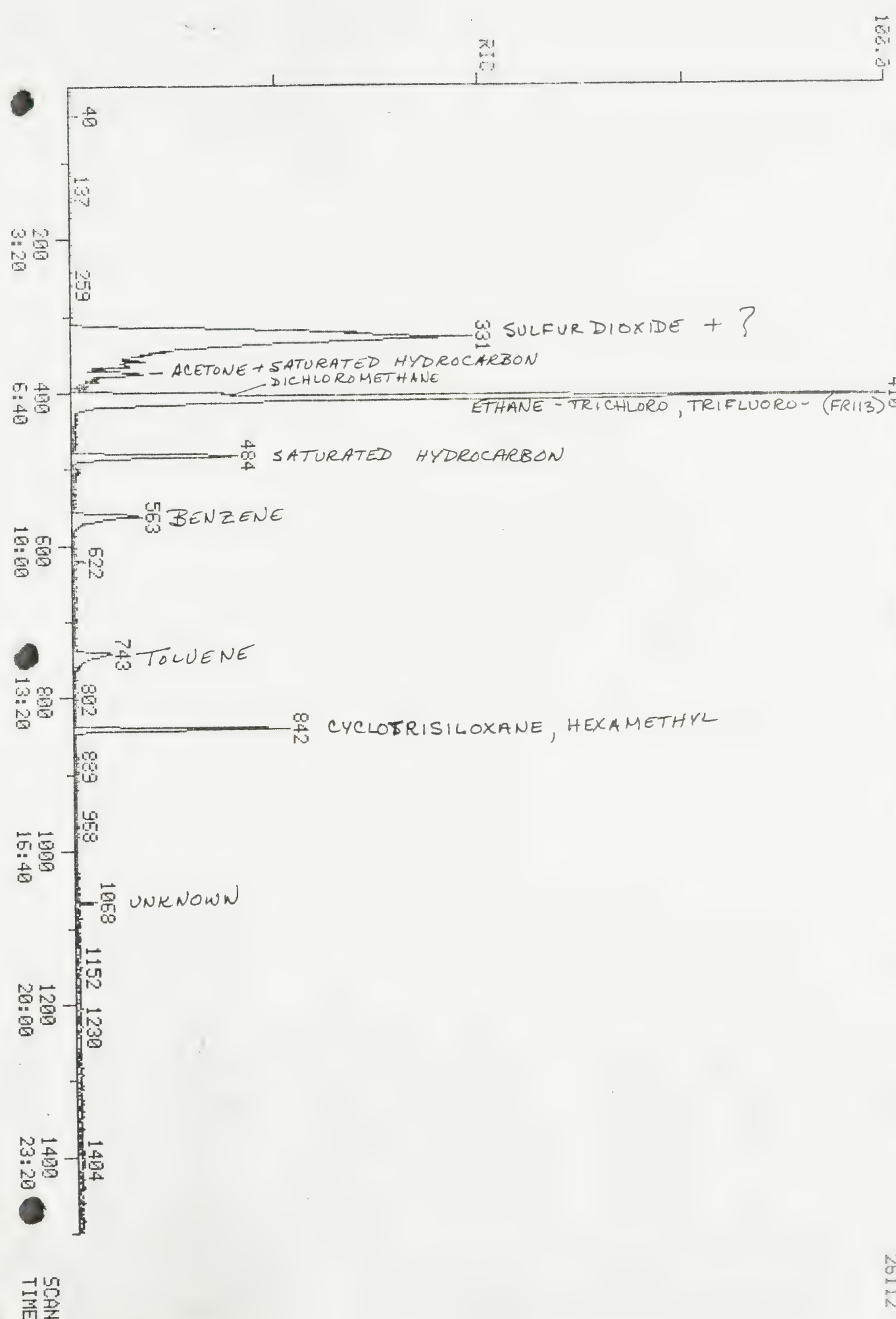


Upwind - Nov

PIC
12/13/84 12:09:00
SAMPLE: SORENT TUBE #20 - UPWIND CONSERVATION AREA (0.2L)
RANGE: G 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3
DATA: 02260 #1454
CALI: 02185 #5

SCANS 1 TO 1500

26112



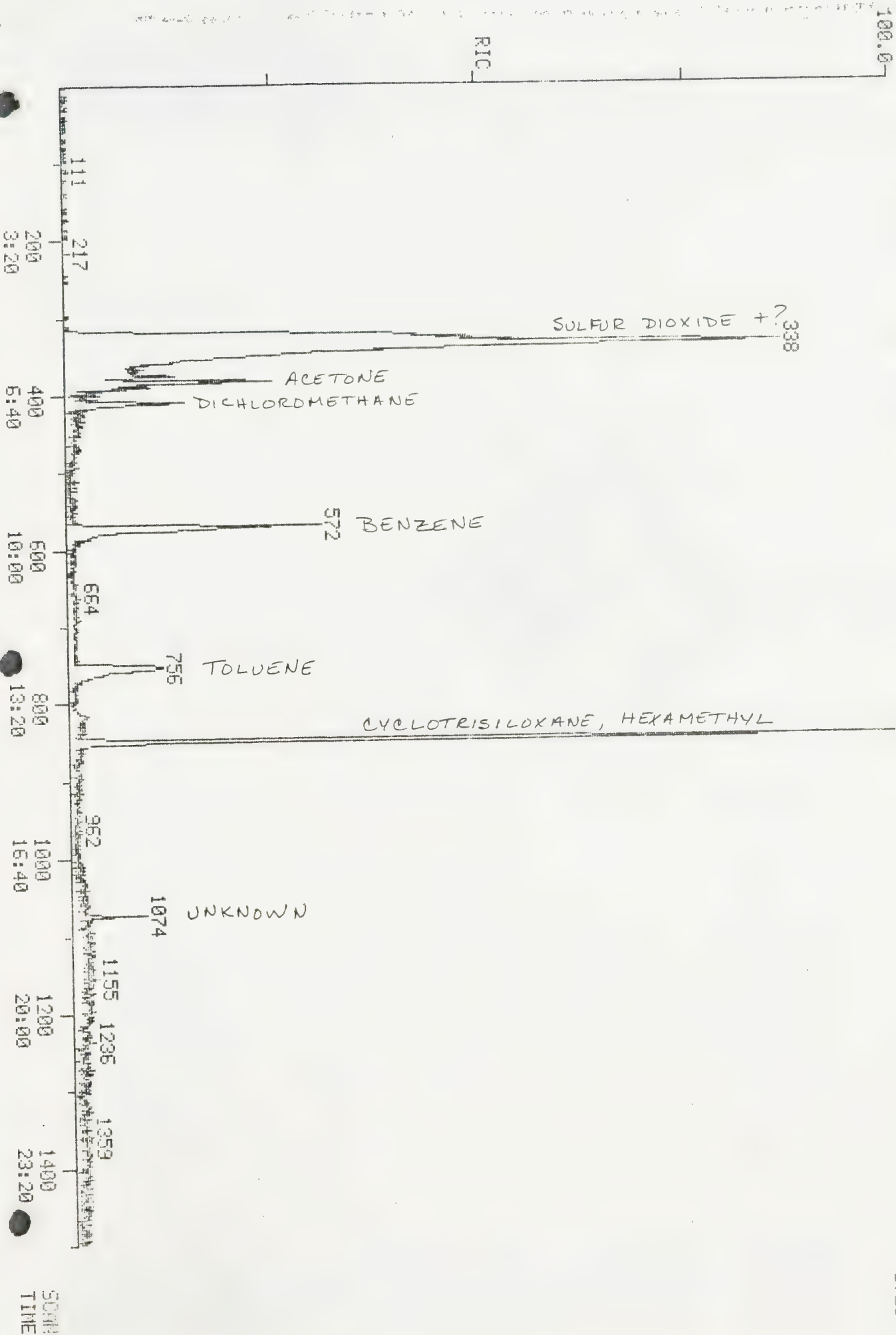
Control - pos

RIC
12/19/84 14:40:00
SAMPLE: SORBENT TUBE #22 - CONTROL - CHURCH OF J.C. (0.15L)
RANGE: C 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 BASE: U 20, 3

DATA: 02253 #876
CALI: 02185 #5

SCANS 1 TO 1500

9728





MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

August 21, 1985

Ms. Anne Koven
Upper Ottawa Landfill Site Office
20 Jackson St.W., Suite 412
Hamilton, Ontario
L8P 1L2

RE: Mann Testing File #852850
Ambient Air Analysis
Landfill and Peripheral Sites

Dear Ms. Koven:

A total of eight multisorbent tubes and four bag samples were collected July 2, 1985 and July 4, 1985 from the Upper Ottawa Landfill and peripheral sites. The specific sampling locations and sampling dates are as follows:

<u>Location</u>	<u>Collection</u> <u>Date</u>	<u>Volume</u>	<u>Wind</u> <u>Direction</u>	<u>Sample</u> <u>Designation</u>
Unsworth & Upper Ottawa	July 4	10.0 L	SW	Upwind
Unsworth & Upper Ottawa	July 2	23.1 L	SW	Upwind
Limeridge at Lennox	July 4	10.0 L	S	Downwind
Limeridge at Lennox	July 2	11.55L	S	Downwind
Blessed Kateri Tekakawitha	July 2	8.3 L	SW	School
Stonechurch & Garth	July 2	7.5 L	E	Control
Public Works Yard	July 2	13.6 L	SE	Public W.
Fire Hall	July 2	19.2 L	SW	Fire Hall
Gooseneck #6 - Offgas	July 4	-	-	Gooseneck#6

Gooseneck #12 -				
Offgas	July 2	-	-	Gooseneck#12
Gooseneck #11 -				
Offgas	July 2	-	-	Gooseneck#11
Unsworth &				
Upper Ottawa	July 2	-	SW	Upwind Bag

The three bag samples collected July 2, 1985 were analysed by Gas Chromatography and the results are listed in Table 1.

The sorbent tubes were thermally desorbed using the Universal Automated Concentrator Model 780, and the released organics separated on a 30 meter SE30 capillary column. Final analysis was carried out using the Finnigan 3200 Mass Spectrometer. Temperature programming included a 5 minute hold at 40°C, then a gradient from 40-200°C at 10/° C/minute.

Sample mass spectra are compared to the spectra contained in the EPA library of 40,000 compounds, and the three best matches for each component are displayed with the computer printouts. A purity, or numerical indication of fit is given for each of the three matches, and the identification criteria is based on a fit of 750 or better.

The quantitative standard was prepared using the static bottle method. This method consists of a cocktail of pure compounds, of which 2 ul was injected into a precleaned 4 L jug equipped with a septum cap. The jug is heated to 60°C and a 2 ml sample was taken and immediately injected onto a sorbent tube, similar to those used in the sample collection. The sorbent tube was then desorbed on the concentrator.

The chromatogram for each of the samples is included with this report, along with the quantitative data, which is shown in part per billion concentrations.

The extra samples, collected on July 4, 1985 were taken to compare quantities and compounds found on different days with varied environmental conditions. On July 2, 1985, there was a brisk wind and a rain storm in the late afternoon. July 4, 1985 was a sunny day with a light to moderate breeze which would account for some of the difference in the two sets of values.

If you have any questions regarding this report or the data, I would be pleased to hear from you.

Yours truly,

MANN TESTING LABORATORIES LTD.

A handwritten signature in cursive script, appearing to read 'E. Cliffe'.

E. Cliffe (Miss)
Occupational Health Department

TABLE 1

COMPOUND	Upwind Bag #16	Gneck 11 Bag #10	Gneck 12 Bag #14
Oxygen	21.0%	16.8%	11.5%
Nitrogen	Bal	Bal	Bal
Carbon Dioxide	361 ppm	5.02%	8.58%
Methane	1.2 ppm	3.70%	3.70%
Total Non-Methane Hydrocarbon in ppm Methane Equivalance	4.0 ppm	15.22 ppm	17.87 ppm
Halogenated Hydrocarbons	Trace	Trace	Trace
Propane & Propylene	ND	2.7 ppm	2.7 ppm
Ethane & Ethylene	ND	4.0 ppm	2.2 ppm

REF: 100709 #1
DATE: 100709 #1

DATA: 100709 #1
DATE: 100709 #1

SCANS 1 TO 1500
54g

35504

SULFUR DIOXIDE (SYS. CONT.)

BENZENE

TOLUENE

TRICHLOROETHANE

DICHLOROMETHANE

ACETONE

ETHYL BENZENE

XYLENE

BENZALDEHYDE

NAPHTHALENE

1367

1195

753

SULFUR DIOXIDE (SYS. CONTAM.)

ACETONE

BENZENE

TOLUENE

XYLENE
STYRENE

BENZALDEHYDE

} SATURATED
HYDROCARBONS
C₈ → C₁₂

DATE RECEIVED #1
10/15/1990
5462

SULFUR DIOXIDE (SYS. CONT.)

ACETONE

1,1,1 TRICHLOROETHANE

BENZENE

TOLUENE

TETRACHLOROETHENE

ETHYL BENZENE

XYLENE

BENZALDEHYDE

NAPHTHALENE

1601 160710 #1

5464

SULFUR DIOXIDE (CONT.)

DICHLOROMETHANE

BENZENE

TOLUENE

SILICON OIL (CONT.)

- 565 -

NAPHTHALENE

BENZALDEHYDE

XYLENE

SILICON GPD. (SYS. CONT.)

TOLUENE

BENZENE

DICHLOROMETHANE

SULFUR DIOXIDE (SYS. CONT.)

SULFUR DIOXIDE (CONTAMINATION)

ACETONE

BENZENE

TOLUENE

XYLENES

BENZALDEHYDE

DATE 11 11 11

SULFUR DIOXIDE

ACETONE

DICHLOROMETHANE

SATURATED HYDROCARBON

BENZENE

TOLUENE

XYLENE

BENZALDEHYDE

NAPHTHALENE

BENZALDEHYDE

DICHLOROMETHANE

ACETONE

SULFUR DIOXIDE

2

SULFUR DIOXIDE

DICHLOROMETHANE

TOLENE

SATURATED HYDROCARBON

00001 10000

00001 10000

513372

SATURATED HYDROCARBON

TOLENE

DICHLOROMETHANE

SULFUR DIOXIDE

1 TO 1000

513372

100% PURE

RIC

07/17/85 18:48:00

SAMPLE: 30000000

00000000

00000000

DATA: HQ0712 #1

DATA: F00004 #2

FILE: 000000 - 000000

000000 - 000000 - INITIAL HOLD FOR 5 MIN

000000 - 000000 - 000000 - 000000

SCANS 1 TO 1500

1183

SATURATED HYDROCARBON

XYLENES

TOLENE

UNSATURATED HYDROCARBON

SATURATED HYDROCARBON

DICHLOROMETHANE

SULFUR DIOXIDE (SYS. CONT.)

420854.

SCAN
TIME

1400
23:20

1200
20:00

1000
16:40

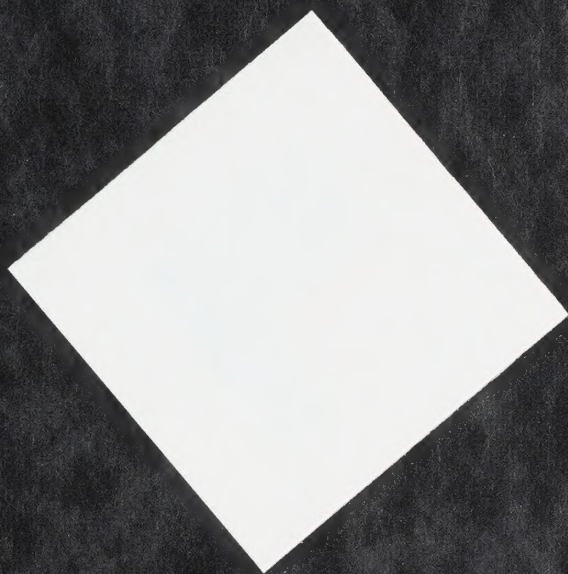
800
13:20

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10:00

400
6:40

200
3:20





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25074	—	GREY / GRIS	—	BD2507
25073	—	R. BLUE / BLEU R.	—	BB2507
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25070	—	YELLOW / JAUNE	—	BY2507
25077	—	TANGERINE	—	BA2507

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